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Spectrum
Engineering (Firm)
Crow Rock and
Draper projects,
Custer and Rosebud
Counties, Montana

FINAL REPORT

CROW ROCK AND DRAPER PROJECTS
CUSTER AND ROSEBUD COUNTIES MONTANA

MT A/E 86-46-134

JANUARY 1988

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FINAL REPORT

CROW ROCK AND DRAPER PROJECTS
CUSTER AND ROSEBUD COUNTIES MONTANA

MT A/E 86-46-134

JANUARY 1988

Prepared for:
MR. RICHARD JUNTUNEN, CHIEF
Abandoned Mine Reclamation Bureau
Department of State Lands
1625 11th Avenue
Helena, Montana 59620

Prepared by:
SPECTRUM ENGINEERING
Mining & Civil Engineers
3302 Fourth Avenue North
Billings, Montana 59101

William Maehl, P.E.
Project Engineer

Bill Wolff
Project Inspector

PLEASE RETURN

CROW ROCK AND DRAPER
FINAL REPORT

I. INTRODUCTION

A. Project Objectives

This project has two separate reclamation sites. The reclamation work has been undertaken to close mine openings (shafts and adits), fill subsidence areas, remove debris and to revegetate all mining and construction related disturbances.

B. Site Description and Location

1. CROW ROCK

The CROW ROCK site consists of an open pit, three adits, eight subsidence areas and a large amount of debris including the remains of a topple and wooden ore cars located in and above East Uall Creek approximately 33 miles north of Miles City, Montana. The area near the mine site consists of gentle rolling grassland hills used primarily for stock grazing. The vegetation in the area consists of native grasses, sagebrush, cactus, rhus, backbrush and small spots of cottonwood trees in the creek bottoms. The major subsidence areas are located at an approximate elevation of 2995 feet above sea level. The adits are located in the vertical coulee banks.

The site is located in the SW 1/4 of Section 17, Township 12 North, Range 45 East, Custer County, Montana as shown on the Site and Vicinity Map.

2. DRAPER

The DRAPER mine is located on both sides of a ridge overlooking a large reservoir. The reservoir is located in an ephemeral drainage which drains into the Horse Creek drainage approximately 1 mile southwest of the mine site. The area surrounding the site is moderately hilly with scoria outcroppings and is approximately 10 miles northeast of Forsyth, Montana. The main mine workings are located at an elevation of approximately 2625 feet to 2675 feet above sea level. The highest elevation in the area being 2720 feet directly above the mine workings and the lowest point is 2600 feet near the large reservoir. The area surrounding the mine is used for grazing horses and cattle and the vegetation is made up of native grasses, sagebrush, cactus, small ceder trees, some pine in higher elevations and cottonwood and willow in the drainages.

The mine site is located in the E 1/2 of the SW 1/4 of Section 20, Township 7 North, Range 42 East, Rosebud County, Montana as shown on the Site and Vicinity Map.

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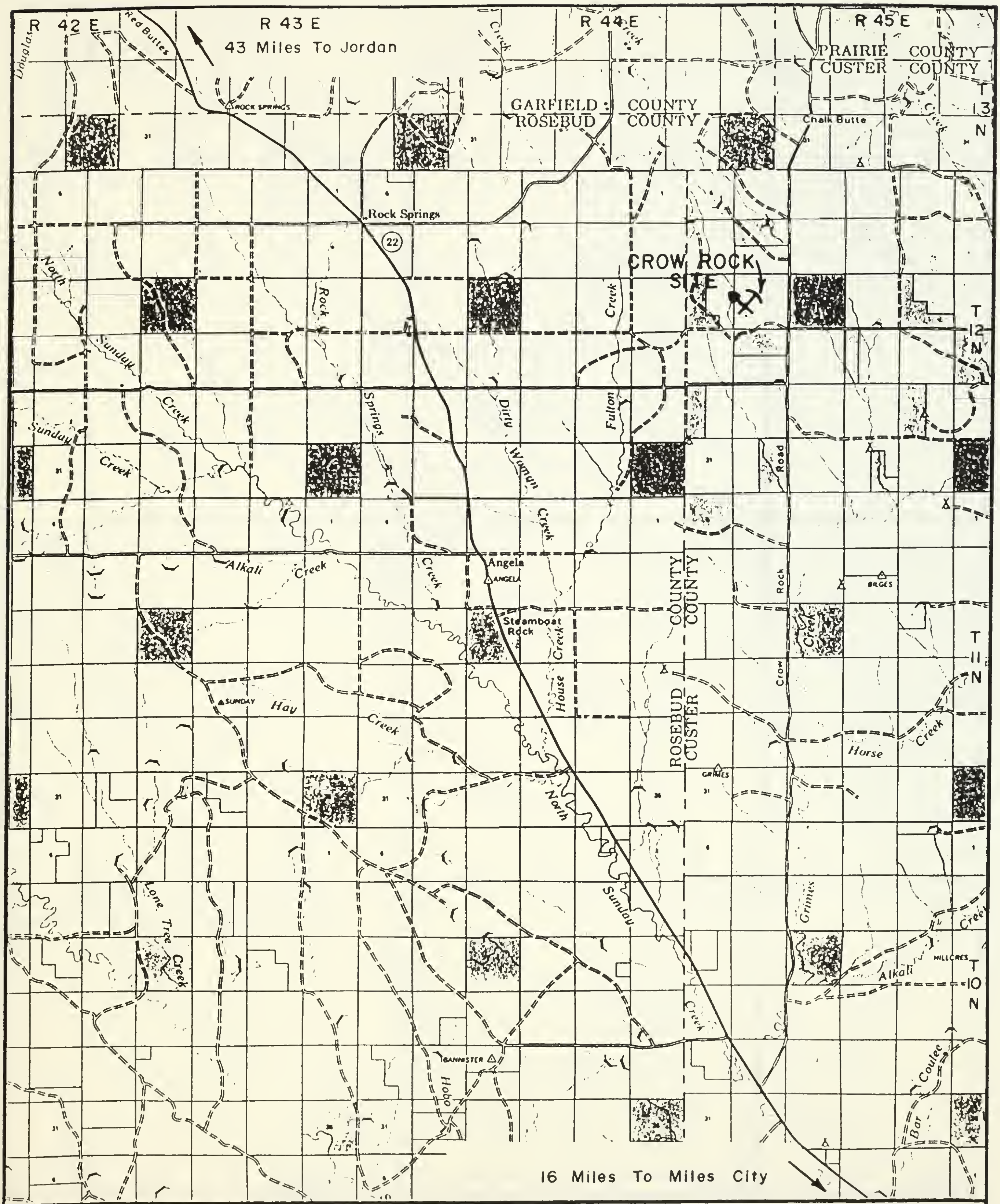
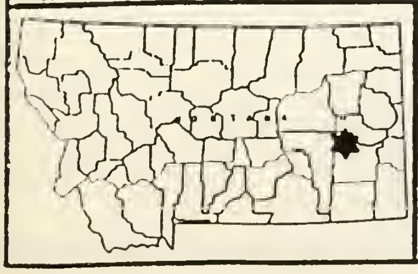
https://archive.org/details/crowrockdraperpr1988spec





STATE OF MONTANA — DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU—RECLAMATION DIVISION

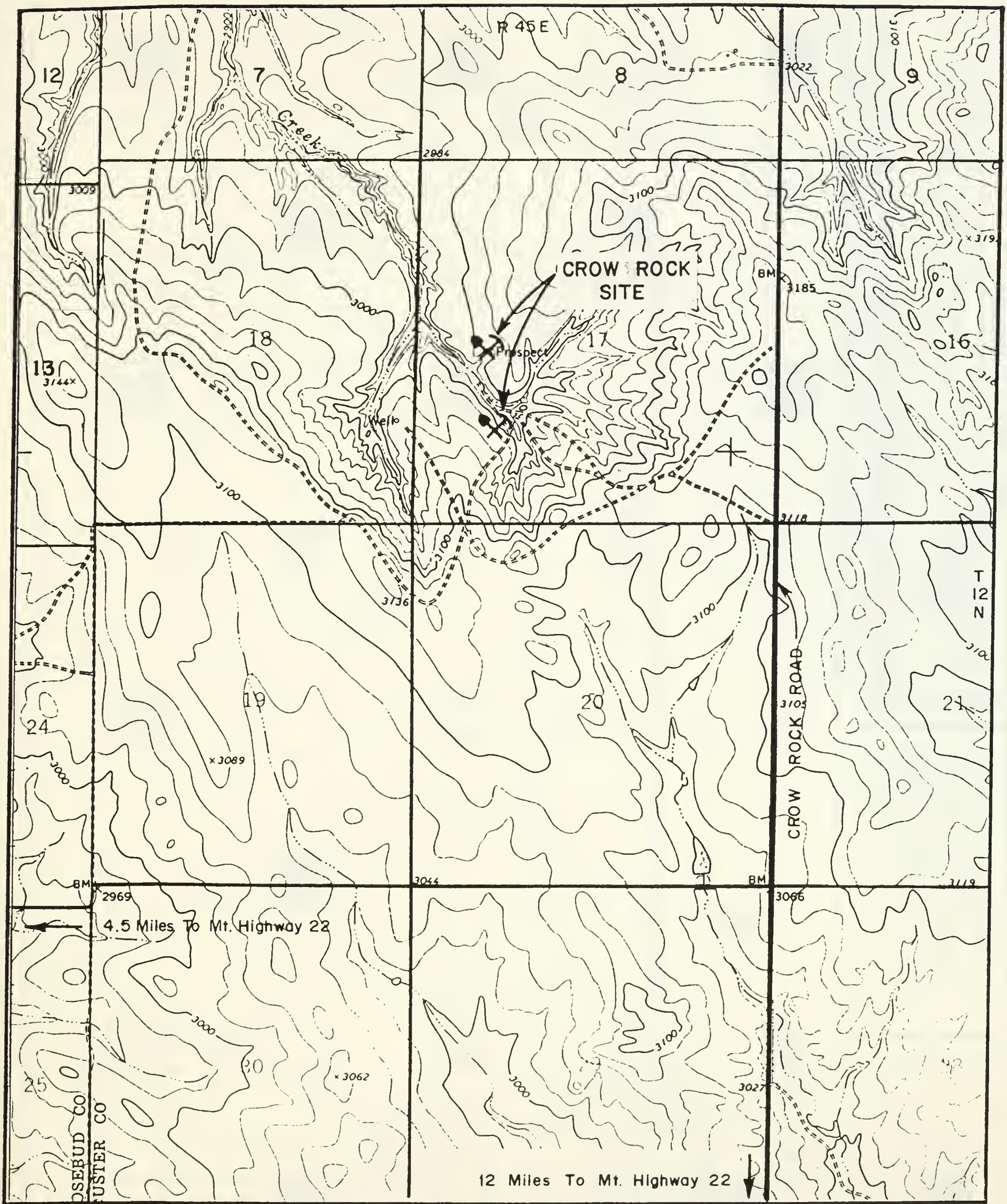
VICINITY MAP

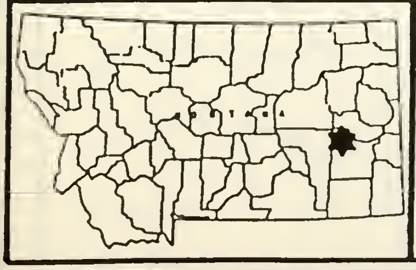
SITE CROW ROCK

CUSTER COUNTY, MT; TOWNSHIP 12N RANGE 45E

SECTION(S) 17

MAP SCALE: 1" = 2.5 Miles





STATE OF MONTANA — DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU—RECLAMATION DIVISION

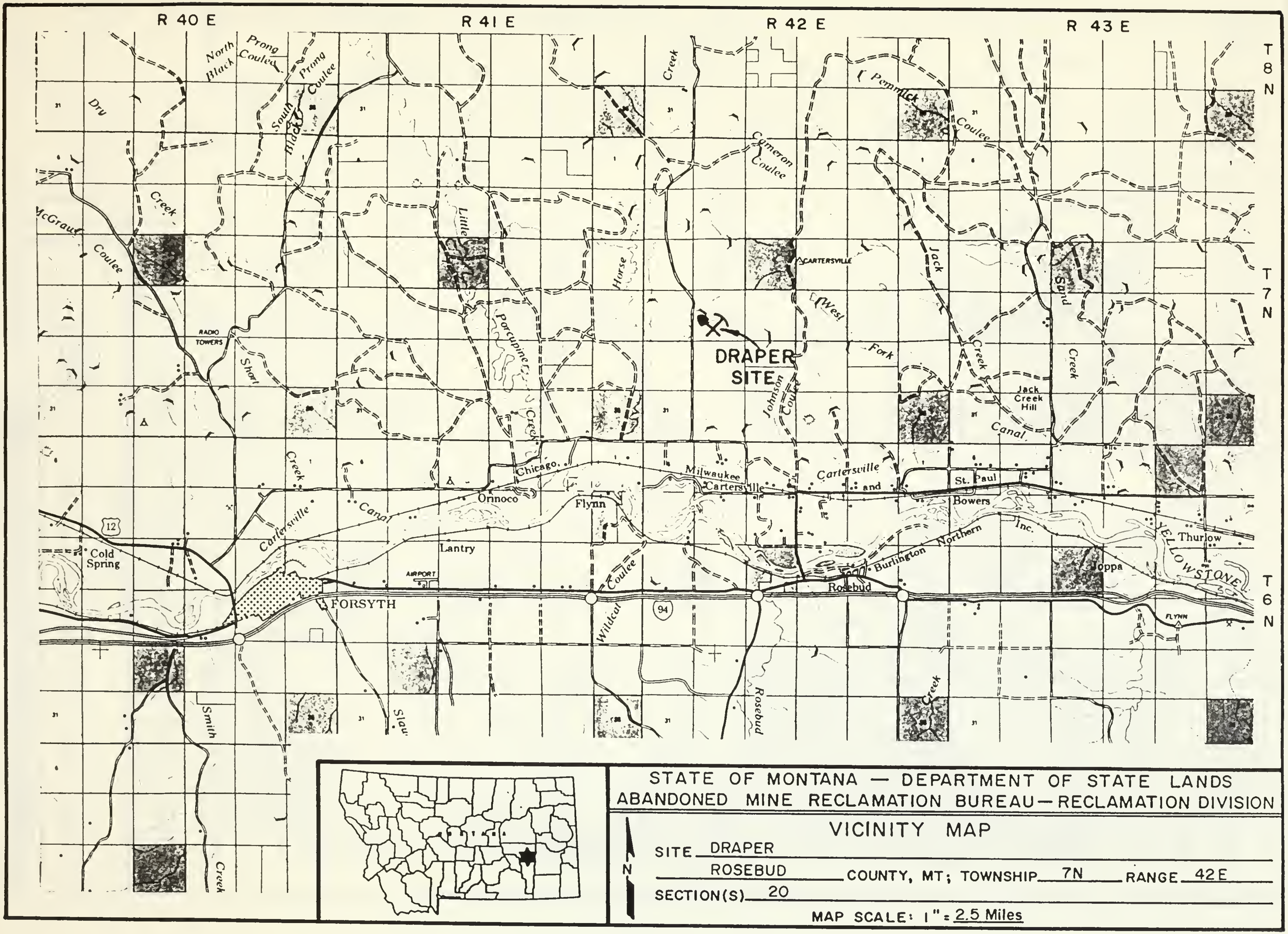
SITE MAP

SITE CROW ROCK

CUSTER COUNTY, MT; TOWNSHIP 12 N RANGE 45E

SECTION(S) 17

MAP SCALE: 1" = 2000' U.S.G.S. QUAD SHEET CROW ROCK SE



STATE OF MONTANA — DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU — RECLAMATION DIVISION

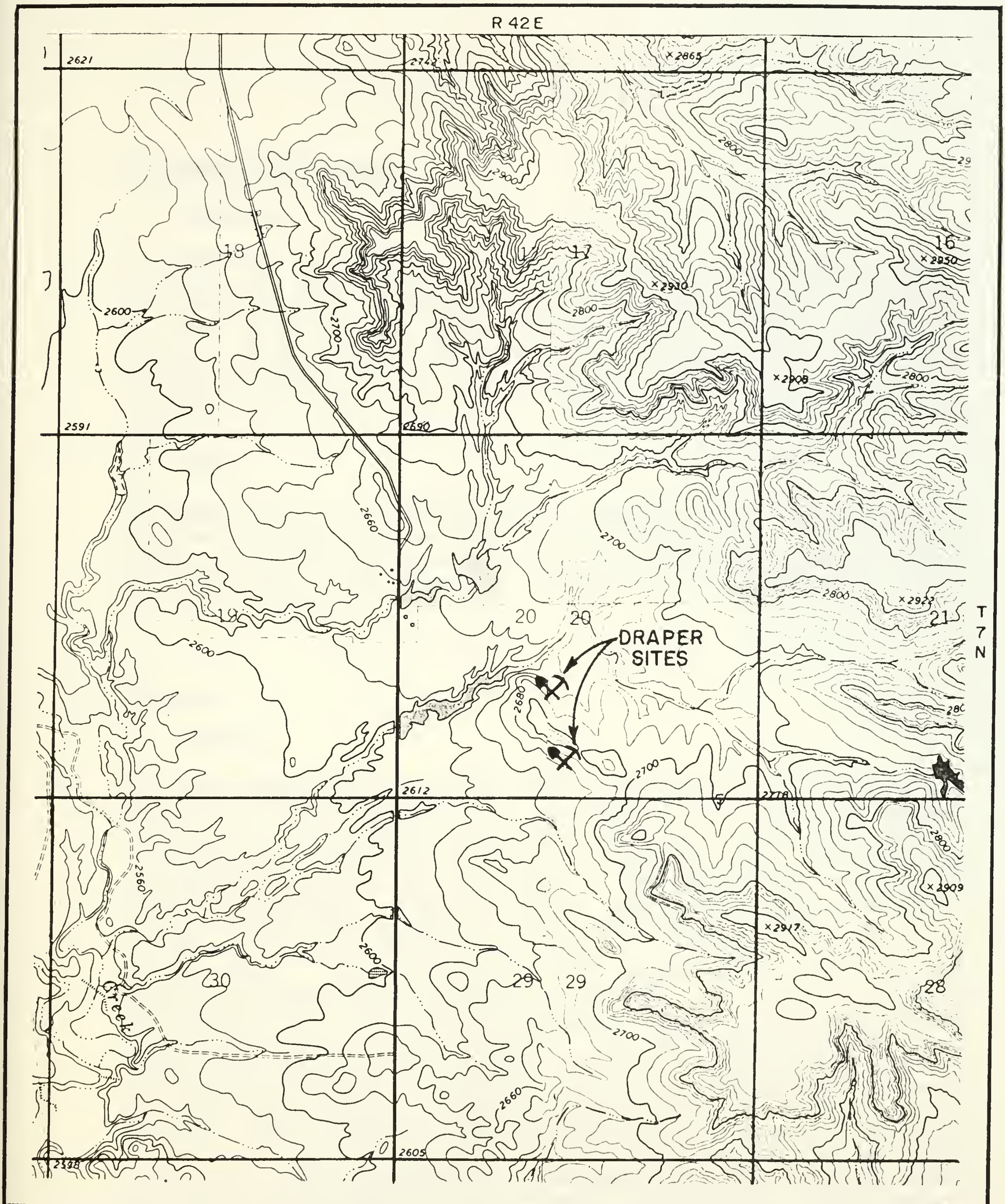
VICINITY MAP

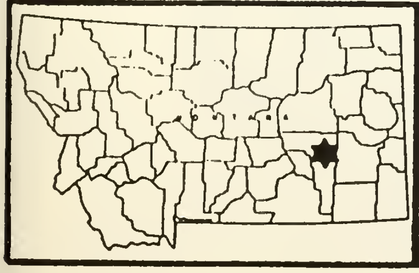
SITE DRAPER

ROSEBUD COUNTY, MT; TOWNSHIP 7N RANGE 42E

SECTION(S) 20

MAP SCALE: 1" = 2.5 Miles





STATE OF MONTANA — DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU—RECLAMATION DIVISION

SITE MAP

SITE DRAPER
ROSEBUD COUNTY, MT; TOWNSHIP 7N RANGE 42E
SECTION(S) 20
MAP SCALE: 1" = 2000' U.S.G.S. QUAD SHEETS ORINOCO & ROSEBUD

C. Land Ownership and Access

1. CROW ROCK

The CROW ROCK site (all of Section 17) is owned by Burlington Northern Railroad, c/o Jim Bishop, Glacier Park Company, P.O. Box 579, Miles City, Montana 59301 at phone 406/232-1274. Another contact is Meridian Land and Minerals, 5613 Denver Technical Center Parkway, Englewood, Colorado 80111 with Ted Hanks being the contact person. Burlington Northern acquired title to the property on 7/12/1916 and the land is currently being leased to a local cattle rancher (Lund) for grazing purposes.

2. DRAPER

The DRAPER site (all of Section 20) is owned by R. Kent and Marjorie M. Montgomery, Rosebud, Montana 59347 at phone 406/347-5569. They acquired title on 12/4/1973 and transferred title to the Montgomery Ranch Company (of which they are the owners) on 12/10/1976. The Montgomery's live in the S 1/2 of Section 4, T6N, R42E.

D. History

1. CROW ROCK

The first underground mine on the site was started by Carl Jensen in the 1920's on the land leased from the Burlington Northern Railroad. Jenson ran the mine until 1948 when Fritz Hout bought the property and operated it until 1959. During this eleven year period the mine continued as an underground operation except for part of one season when an open pit operation was begun. This proved to be unsuccessful because the walls of the pit were too unstable. Hout's underground operation was in a second mine opened by Jensen which extended westerly to the other side of the ridge. Here there was not much overburden but the coal was somewhat weathered which decreased its quality. The mine was operated during much of its lifetime from September to April with about 20,000 tons of coal being mined each season. A cable haulage system was used to pull the coal cars from the mine. Each car could haul about one ton and the cable system was necessary because the coal seam sloped downward from the mine entrance. Originally there was a tipple at the mine entrance. Most of the coal from the mine was sold to the residents of Jordan and ranchers in the area. At one time there were two buildings at the mine. One of which was an abandoned school house that was moved onto the site and served as the residence for Mr. Hout. It was located near the surviving root cellar. Downstream from the schoolhouse was a cook shack. Both buildings were moved to Miles City when the mine closed.

D. History

2. DRAPER

The DRAPER mine was first developed by Robert Draper during the early 1920's on land leased from the Northern Pacific Railroad who obtained a patent for the property on June 26, 1915 (patent #479939). The seam of coal developed was reported to have been thin and relatively poor in quality. In spite of this, the mine had a surprisingly long lifetime of nearly two decades. The underground workings eventually extended about one-half mile under the hillside. During the 1930's the mine was usually worked by four men using the room-and-pillar method with 20-foot rooms off the main tunnel. An air shaft about one-quarter mile from the mine entrance ventilated the mine workings by natural air circulation. The mine was a typical small commercial mine which operated, for the most part, during the fall and winter months to supply coal to the local farmers and ranchers. The mine finally closed during the early 1940's when miners found better paying jobs in the war industries.

II. DESCRIPTION OF RECLAMATION PROJECT

A. Site Hazards and Problems

1. CROW ROCK

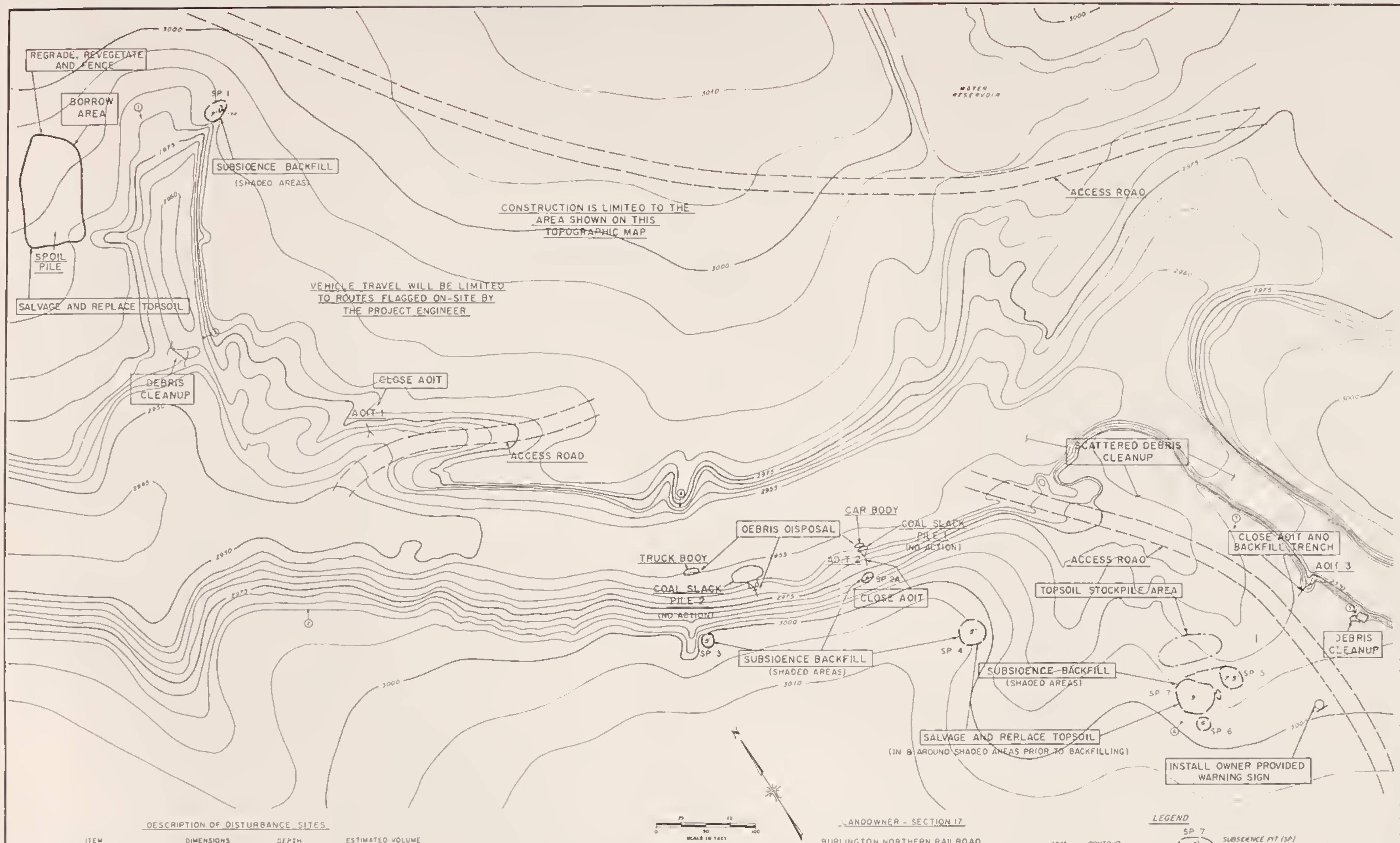
The CROW ROCK site consists of 3 open adits in the banks of Uall Creek. There are 7 subsidence pits located along the banks of Uall Creek. The remains of a tipple is located at the northwest edge of the project in the bottom of the creek. Mining debris consisting of two auto bodies, wood, coal cars, rails, welding rod, glass and metal scraps is scattered across the entire area. An eighth subsidence pit opened up while performing the reclamation work.

2. DRAPER

The DRAPER site consists of a large shaft, a coal slack pile and debris on the southern end of the project. At the north end of the site there are 2 coal slack piles, 1 collapsed adit, 3 subsidence pits, and 3 dugouts across from the adit. An air shaft and waste dump are located approximately 1250 feet north of the southern most shaft. The mine related debris consists of wood, bottles, and miscellaneous debris.

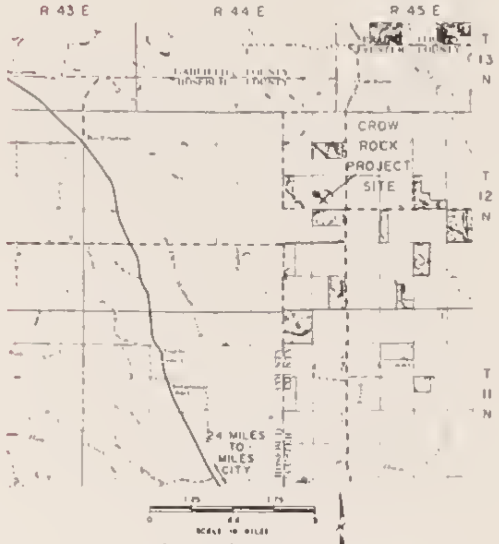
B. Project Planning

The scope of work at both sites was as follows: 1) Eliminate all potential hazards by backfilling all adits, shafts and subsidence areas, 2) Neutralize, bury and revegetate any remaining coal slack not used in backfilling, and 3) Regrade and revegetate all subsidence areas, shafts, borrow areas, haul roads and areas disturbed by construction.

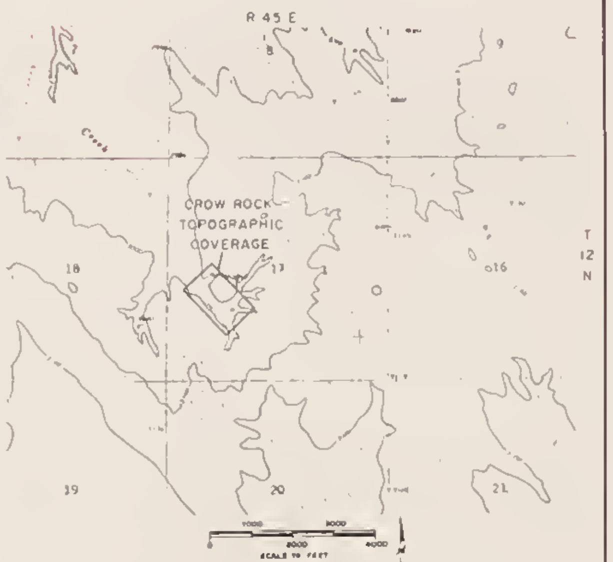

REGRADE, REVEGETATE AND FENCE
BORROW AREA
SPOIL PILE
SALVAGE AND REPLACE TOPSOIL
SP 1
SUBSIDENCE BACKFILL (SHADED AREAS)
CONSTRUCTION IS LIMITED TO THE AREA SHOWN ON THIS TOPOGRAPHIC MAP
VEHICLE TRAVEL WILL BE LIMITED TO ROUTES FLAGGED ON-SITE BY THE PROJECT ENGINEER
WATER RESERVOIR
ACCESS ROAD
DEBRIS CLEANUP
CLOSE ADIT
ADIT 1
ACCESS ROAD
SCATTERED DEBRIS CLEANUP
CAR BODY
COAL SLACK PILE 1 (NO ACTION)
DEBRIS DISPOSAL
TRUCK BODY
ADIT 2
SP 2A
COAL SLACK PILE 2 (NO ACTION)
CLOSE ADIT
ACCESS ROAD
TOPSOIL STOCKPILE AREA
CLOSE ADIT AND BACKFILL TRENCH
ADIT 3
DEBRIS CLEANUP
SP 3
SUBSIDENCE BACKFILL (SHADED AREAS)
SP 4
SUBSIDENCE BACKFILL (SHADED AREAS)
SP 5
SP 7
SP 6
SALVAGE AND REPLACE TOPSOIL (IN & AROUND SHADED AREAS PRIOR TO BACKFILLING)
INSTALL OWNER PROVIDED WARNING SIGN
3000
3010
2975
2960
2955
2950
2965
N
0
50
100
SCALE IN FEET
CONTOUR INTERVAL = 5 FT

Vertical Datum Based On Interpolation To 7½ Quadrangle: CROW ROCK SE, MT. Topography Prepared From Ground Survey Conducted August 27, 1986 By Spectrum Engineering Using A Plane Table And Alidade. This Topography Is Of Reconnaissance Class And Has Not Been Field Checked.

STATE LOCATION MAP



VICINITY ACCESS MAP



SITE LOCATION MAP

DESCRIPTION OF DISTURBANCE SITES

ITEM	DIMENSIONS (FEET)	DEPTH (FEET)	ESTIMATED VOLUME (CUBIC YARDS)
SP 1	14x20	8-14	33 VOID
SP 2A	8x8.5	9	23 VOID
SP 3	18x25	5	44 VOID
SP 4	26x31	5	78 VOID
SP 5	14x27	7	51 VOID
SP 6	13x17	7	30 VOID
SP 7	35x35	9	175 VOID
COAL SLACK PILE 1	5x10	2	NO ACTION
COAL SLACK PILE 2	15x30	4	NO ACTION
SPOIL PILE	65x110	0 to 6	—
ADIT 1	3h x 6½ w	15	15 VOID
ADIT 2	3h x 4w	5	5 VOID
ADIT 3 & TRENCH	15x16	6	53 VOID
REVEGETATION	0.5 ACRES		
FARM FENCE			
Type F-4M	270 LINEAR FEET		
Single Panel	1 EACH		
Double Panel	4 EACH		
Gate - Type G-2	16 LINEAR FEET		

LANDOWNER - SECTION 17

BURLINGTON NORTHERN RAILROAD
c/o MERIDIAN LAND AND MINERALS
5613 DENVER TECHNICAL CENTER
ENGLEWOOD, COLORADO 80111

CONTACT

POLLY SMITH OR TED HANKS
MERIDIAN LAND AND MINERALS
PHONE (303) 930-9260

LEGEND

—2975—	*CONTOUR*	SP 7 (9')	*SUBSIDENCE PIT (SP) NUMBER (& DEPTH)*
▭	*BUILDING*	—<	*OPEN ADIT*
═ ═ ═	*ACCESS ROAD*	—+<	*CLOSED ADIT*
— — —	*TRAIL*	◪	*SHAFT*
①→	*PICTURE NUMBER AND ORIENTATION*	⬭	*SPOIL PILE*
-+—+-	*FENCE*	— —	*DRAINAGE*

WORK DESCRIPTION

BACKFILL SUBSIDENCE PITS AND SEAL ADITS WITH MATERIAL FROM THE SPOIL PILE AREA. REGRADE THE BORROW (SPOIL) AREA TO PROVIDE UNIFORM TRANSITIONS WITH EXISTING CONTOURS. HAUL AWAY CAR AND TRUCK BODIES AND DISPOSE OF ALL DEBRIS. ALL DISTURBANCE AREAS WILL BE SEEDED, FERTILIZED AND MULCHED. ADDITIONAL DETAILED WORK DESCRIPTIONS ARE LOCATED IN THE SPECIAL PROVISIONS

NOTICE

AN ABANDONED COAL MINE UNDERLIES THIS SITE MANY POTENTIAL HAZARDS EXIST. THE EXTENT OF THESE HAZARDS IS NOT FULLY KNOWN CONTRACTORS AND OTHER PERSONS WORKING AT THE SITE SHALL APPRISE THEMSELVES OF THE CONDITIONS AND TAKE WHATEVER STEPS ARE DEEMED NECESSARY TO INSURE SAFETY WHILE PERFORMING THEIR DUTIES.

WILLIAM C. MAEHL
5274 E

SITE PLAN AND GENERAL LAYOUT

CROW ROCK SITE

SECTION 17, T12N, R45E
CUSTER COUNTY, MONTANA

STATE OF MONTANA
DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU, RECLAMATION DIVISION

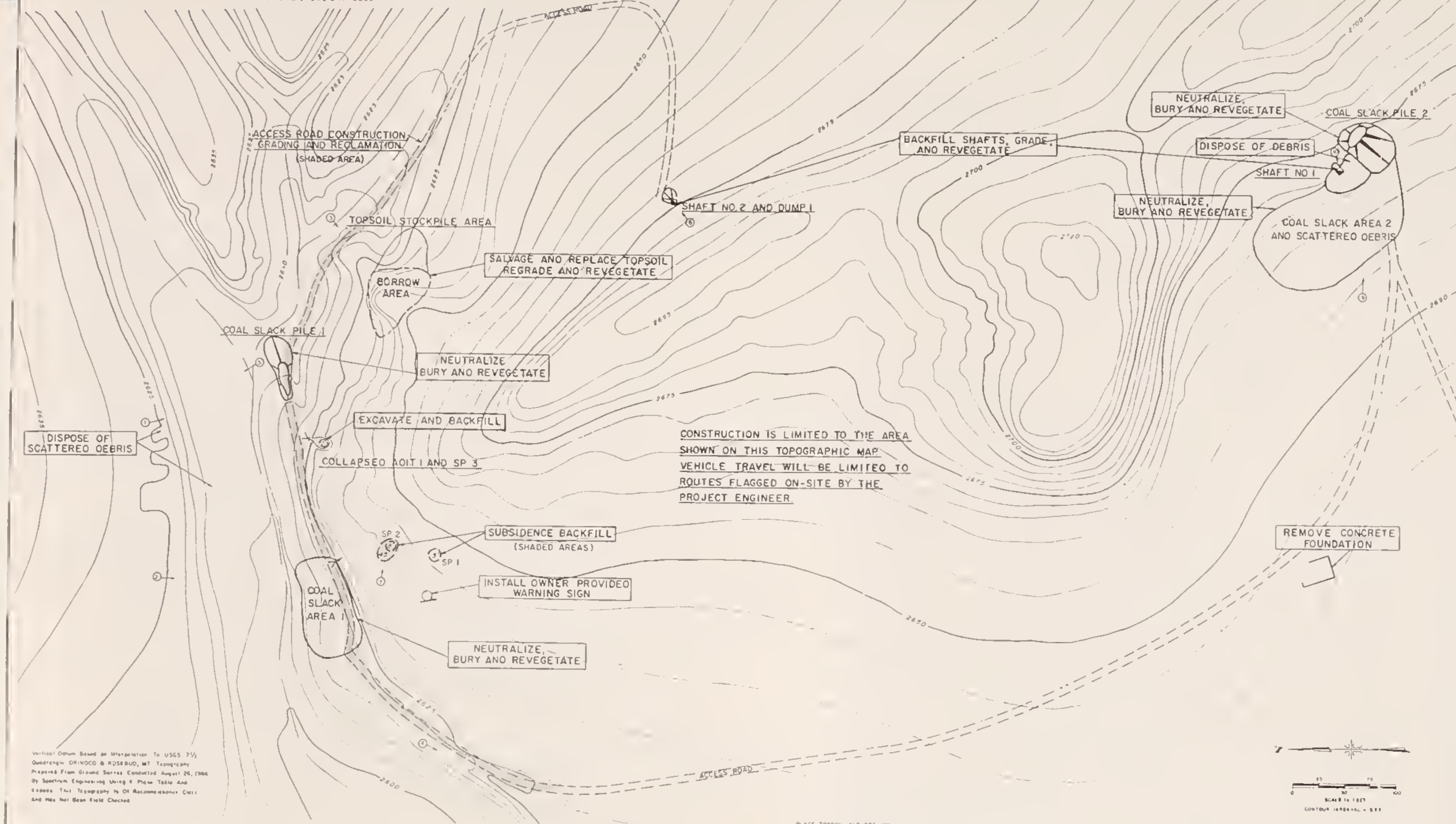
DATE: 12-19-86
DRAWN BY: LNR
CHECKED BY: RLB
APPROVED BY: W. Maehl

REVISIONS NO	DATE	BY
	2/87	DLO

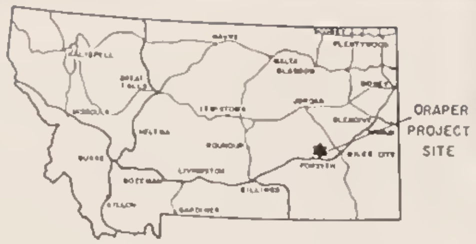
SPECTRUM ENGINEERING
Mining and Civil Engineers
3302 4th AVE NORTH
BILLINGS, MONTANA

SHEET NO 1 of 2   PLAN SET NO ____

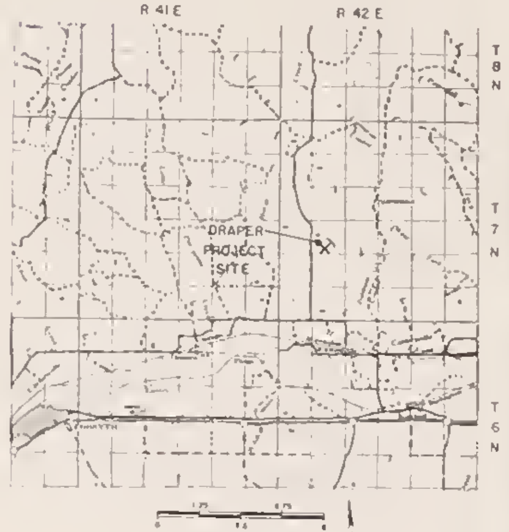
LANDOWNER - SECTION 20
MONTGOMERY RANCH COMPANY
c/o R KENT & MARJORIE MONTGOMERY
ROSEBUD COUNTY, MT 59347
PHONE (406) 347-5569


ACCESS ROAD
ACCESS ROAD CONSTRUCTION, GRADING AND RECLAMATION (SHADED AREA)
TOPSOIL STOCKPILE AREA
SALVAGE AND REPLACE TOPSOIL REGRADE AND REVEGETATE
BORROW AREA
COAL SLACK PILE 1
NEUTRALIZE BURY AND REVEGETATE
SHAFT NO 2 AND DUMP 1
BACKFILL SHAFTS, GRADE, AND REVEGETATE
NEUTRALIZE, BURY AND REVEGETATE
COAL SLACK PILE 2
DISPOSE OF DEBRIS
SHAFT NO 1
NEUTRALIZE, BURY AND REVEGETATE
COAL SLACK AREA 2 AND SCATTERED DEBRIS
DISPOSE OF SCATTERED DEBRIS
EXCAVATE AND BACKFILL
COLLAPSED ADIT 1 AND SP 3
CONSTRUCTION IS LIMITED TO THE AREA SHOWN ON THIS TOPOGRAPHIC MAP VEHICLE TRAVEL WILL BE LIMITED TO ROUTES FLAGGED ON-SITE BY THE PROJECT ENGINEER
SP 2
SP 1
SUBSIDENCE BACKFILL (SHADED AREAS)
INSTALL OWNER PROVIDED WARNING SIGN
COAL SLACK AREA 1
NEUTRALIZE, BURY AND REVEGETATE
REMOVE CONCRETE FOUNDATION
2700
2710
2675
2650
2625
2600
SCALE IN FEET
CONTOUR INTERVAL = 5 FT

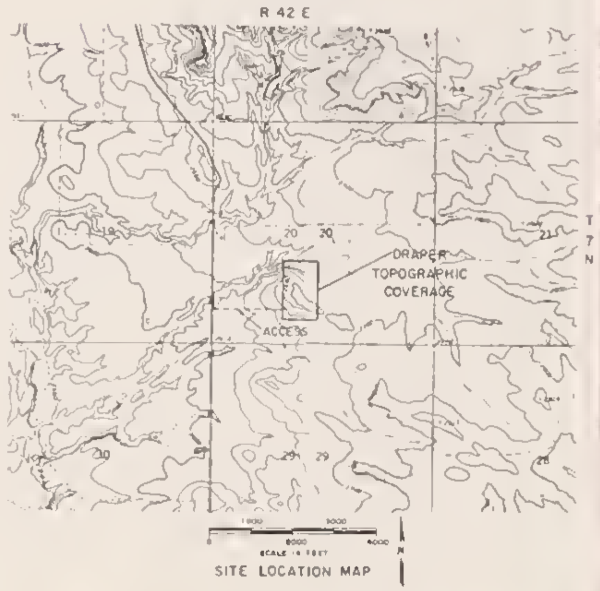
Vertical Datum Based on Interpolation To USGS 7½ Quadrangle ORINOCO & ROSEBUD, MT Topography Prepared From Ground Survey Conducted August 26, 1986 By Spectrum Engineering Using A Plane Table And Alidade. This Topography Is Of Reconnaissance Quality And Has Not Been Field Checked



STATE LOCATION MAP



VICINITY ACCESS MAP



SITE LOCATION MAP

DESCRIPTION OF DISTURBANCE SITES

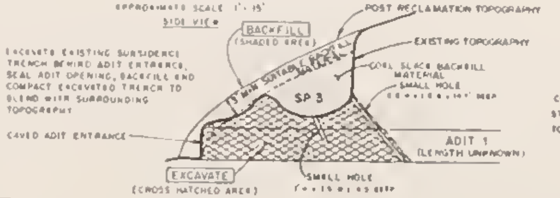
ITEM	APPROXIMATE SIZE (ft)	AVERAGE DEPTH (ft)	ESTIMATED VOLUMES (yd³)
COAL SLACK PILE 1	20 x 60	2 - 4	85 EXCAVATE
COAL SLACK PILE 2	37 x 56	3 - 10	234 EXCAVATE
COAL SLACK AREA 1	0.1 ACRE	—	—
COAL SLACK AREA 2	0.3 ACRE	—	—
SHAFT NO 1	12 x 13	18	100 VOID
SHAFT NO 2	6 x 6	27	55 VOID
ROCK DUMP 1	15 x 18	3	20 EXCAVATE
SP 1	10 x 12	3	7 VOID
SP 2	18 x 25	7	43 VOID
SP 3	14 x 27	8	112 EXCAVATE 130 BACKFILL
REVEGETATION	0.8 ACRES		

WORK DESCRIPTION

COAL SLACK PILES 1 AND 2, AND ROCK DUMP 1 WILL BE EXCAVATED AND PLACED IN THE OPEN SHAFTS AND SUBSIDENCE PITS AS BACKFILL MATERIAL. THE COLLAPSED ADIT 1 ENTRANCE WILL BE EXCAVATED AND SUBSIDENCE PIT 3 WILL BE BACKFILLED WITH COAL SLACK. ALL COAL SLACK AREAS WILL BE NEUTRALIZED WITH LIME AND TOPSOILED. THE BACKFILLED SHAFTS AND SUBSIDENCE PITS WILL BE TOPSOILED. ALL DISTURBANCE AREAS WILL BE SEEDED, FERTILIZED AND MULCHED. THE CONCRETE FOUNDATION AND DEBRIS WILL BE REMOVED. A DETAILED WORK DESCRIPTION IS LOCATED IN THE SPECIAL PROVISIONS

TRENCH EXCAVATION AND ADIT BACKFILL DETAIL

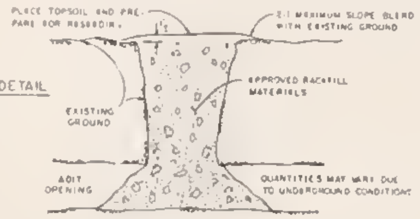
APPROXIMATE SCALE 1" = 15'
SIDE VIEW

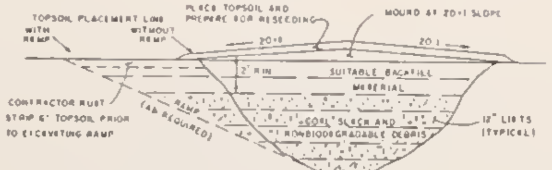


EXCAVATE EXISTING SUBSIDENCE TRENCH BEHIND ADIT ENTRANCE, SEAL ADIT OPENING, BACKFILL AND COMPACT EXCAVATED TRENCH TO BLEND WITH SURROUNDING TOPOGRAPHY

SHAFT BACKFILL DETAIL

NO SCALE


PLACE TOPSOIL AND PREPARE FOR RESEEDING
1'±
2:1 MAXIMUM SLOPE BLEND WITH EXISTING GROUND
APPROVED BACKFILL MATERIALS
EXISTING GROUND
ADIT OPENING
QUANTITIES MAY VARY DUE TO UNDERGROUND CONDITIONS


TOPSOIL PLACEMENT LINE WITH RAMP
WITHOUT RAMP
PLACE TOPSOIL AND PREPARE FOR RESEEDING
MOUND AT 20:1 SLOPE
20:1
20:1
2' MIN
SUITABLE BACKFILL MATERIAL
CONTRACTOR MUST STRIP 6" TOPSOIL PRIOR TO EXCAVATING RAMP
RAMP (AS REQUIRED)
COAL SLACK AND NONBIODEGRADABLE DEBRIS
12" LIFTS (TYPICAL)

SUBSIDENCE BACKFILL DETAIL

NO SCALE

LEGEND

—2650—	CONTOUR	SP 1 ⬭	SUBSIDENCE PIT (SP) NUMBER (& DEPTH)
③→	PICTURE NUMBER AND ORIENTATION	—<	OPEN ADIT
══	ACCESS ROAD	—+<	CLOSED ADIT
— — —	TRAIL	◪	SHAFT
▭	BUILDING	⬭	COAL SLACK AREA
— —	DRAINAGE		COAL SLACK PILE

NOTICE

AN ABANDONED COAL MINE UNDERLIES THIS SITE. MANY POTENTIAL HAZARDS EXIST. THE EXTENT OF THESE HAZARDS IS NOT FULLY KNOWN. CONTRACTORS AND OTHER PERSONS WORKING AT THE SITE SHALL APPRISE THEMSELVES OF THE CONDITIONS AND TAKE WHATEVER STEPS ARE DEEMED NECESSARY TO INSURE SAFETY WHILE PERFORMING THEIR DUTIES

WILLIAM C. MAEHL
5274 E

SITE PLAN AND GENERAL LAYOUT

DRAPER SITE
SECTION 20, T 7 N, R42E
ROSEBUD COUNTY, MONTANA

STATE OF MONTANA
DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU, RECLAMATION DIVISION

DATE: 12-19-86
DRAWN BY: KMI
CHECKED BY: BLK
APPROVED BY: A.C. Ball

REVISIONS NO	DATE	BY

SPECTRUM ENGINEERING
Mining and Civil Engineers
3302 4th AVE NORTH
BILLINGS, MONTANA

SHEET NO 1 of 2
PLAN SET NO. ____

C. Chronological History

1. The project was advertised for the three consecutive weeks of May 7, 14, and 21, 1987 in the Great Falls Tribune, Independent Record, Billings Gazette, Miles City Star, and the Independent Enterprise.

2. The pre-bid conference was held at the Rosebud County courthouse parking lot in Forsyth on May 14 ,1987. Bill Maehl from Spectrum Engineering conducted the pre-bid meeting.

3. Bids were opened on June 2, 1987.

4. The agreement was signed and the contract awarded on June 5, 1987 to:

   Mitchell Brothers Construction
   P.O. Box 736
   Glendive, Montana 59330
   Phone: 406/365-4576

5. The pre-construction meeting was held at the two sites on June 18, 1987. Terry Mitchell from Mitchell Brothers and Bill Maehl and Bill Wolff from Spectrum Engineering were present.

6. Contract time started June 23, 1987 with the Notice To Proceed.

7. All work, with the exception of revegetation, was completed on July 15, 1987.

8. A temporary verbal shutdown order was issued effective July 15, 1987.

9. Work resumed with fall revegetation on October 26, 1987.

10. Revegetation work was completed on October 28, 1987. The Contractor used 27 days of the 60 day contract.

D. Equipment

1. Michigan Clark 110-11B 11 cu. yd. paddle-scraper.
2. Terex TS-14 14 cu. yd. scraper.
3. Allis Chalmers HD-11 dozer.
4. Caterpillar D-7 dozer.
5. Case 680E backhoe and front end loader combination.
6. Case 580E backhoe and front end loader combination.
7. Dodge dump truck.
8. International 2500 gallon water truck.
9. Small Fordson tractor.
10. Boyd 4 cyl. Aero Mulcher.
11. Mulcher-Crimper.
12. McCormick double disk.
13. McCormick seed drill (10 row).
14. Honda pump with 2" suction and discharge.

E. Daily Construction Log

Terry Mitchell was designated as the construction on site superintendent. Mitchell Brothers Construction will handle all phases of construction, earthwork, fencing and seeding. The construction averaged nine hour work days, four days per week. The construction of the project was completed as follows:

June 18, 1987 - Pre-construction meeting.

June 23, 1987 - First calendar day of project. Actual starting date was delayed until June 29th due to rain.

June 29, 1987
- Mobilized equipment to CROW ROCK site.
- Received Contractor's work schedule.
- Started debris cleanup.
- Removed and stockpiled topsoil from borrow area and SP 3, 4, and 7 with paddle scraper.
- Removed car body from below Adit 3 and placed in SP 7 to be crushed with 680E backhoe.
- Removed powder house next to Adit 2 with backhoe.
- Unloaded fencing and mulching material.

June 30, 1987
- Received burn permit #87146 Custer County.
- Burning debris in SP 7.
  Weight of water truck caused a new subsidence pit to open up while spreading water around burn pit.
- Dump 2200 gallons of water into SP 7 to lighten load on water truck.
- Check size of new SP (named SP 8) and calculate volume of borrow needed.
- Second auto body placed in SP 7 and crushed.

E. Daily Construction Log (Cont.)

June 30, 1987 (Cont.)

- Topsoil removal from SP 2A, 5 and 6 with backhoe.
- Borrow material to SP 3 and 4. Adding water to borrow area to help compaction.
- Dozer shaping SP 5, 6, and 7 into one large bowl shaped SP.
- Borrow material placement, compaction and topsoiling complete in SP 3 and 4.
- Checked new SP 8 at 3:00 p.m. and it had doubled in length.
- Excavating new SP 8 before backfilling.
- All compaction is being done with rubber tired vehicles and backhoe bucket pressure in the case of Adits.
- Tearing down tipple and continuing with debris cleanup.
- Water to borrow areas and haul roads

July 1, 1987

- Hauling borrow to SP 5, 6 and 7 with scraper.
- Continue debris clean-up.
- Topsoil removal from Adit 3 with backhoe.
- Install warning sign.
- Stake fence around borrow area.
- Debris clean-up 100% complete.

July 2, 1987

- Borrow material to SP 5, 6 and 7 with scraper.
- Fencing in borrow area. Fence alignment changed to include larger borrow area. Change Order 1.
- Change Order 1, Bid item 5 changed to add backfilling new sink hole (SP 8) caused by weight of water truck.
- Excavate and begin backfilling Adits 1 and 2 with backhoe.
- Finish borrow backfill and regrading SP 2A, 5, 6 and 7 with dozer.
- Four fence corner posts installed.

July 3, 1987

- Continue backfilling and compacting Adits 1 and 2.
- Contractor stopped hauling borrow to work on fencing.
- Four double fence panels and one single panel installed.
- Contractor stops work early for holiday.

July 6, 1987

- Contractor servicing machinery.
- Complete the backfilling of SP 1 and Adit 2.
- 680E backhoe breaks down. Rear seal out of the transmission.

E. Daily Construction Log (Cont.)

July 6, 1987 (Cont.)	- Mr. Lund (lessee) moved cattle into the area. He wanted to know if the Contractor would haul him a load of water due to the fact that his well pump was broke. Contractor agreed to haul the water. - Borrow to haul road down side of dam with scraper. - Borrow complete to all SP's and Adits. - HD-11 dozer regrading SP's and borrow area prior to spreading topsoil. - Topsoil spread on all Adits, SP's and borrow area. - Continue fencing borrow area. - Check mulch for average bale weight. 5 bales averaged 61 lbs per bale.
July 7, 1987	- Continue fencing borrow area. - Mulching all disturbed areas including haul roads. Contractor is 500 lbs. short on mulch, will finish mulching CROW ROCK tomorrow. - Fencing complete except for wooden stays in gate. Contractor will finish gate when he returns with extra mulch. - Mobilize all equipment except mulching equipment for the DRAPER project. - Called landowner and informed them of construction start.
July 8, 1987	- Contractor arrives at the DRAPER site and walks through project with inspector. - Contractor will get permission to haul water from nearby stock dam. - Contractor returns to CROW ROCK site to complete mulching and crimping. - Contractor had equipment breakdown between sites. No work on DRAPER project today.
July 9, 1987	- Mulching and crimping complete at the CROW ROCK site. - Debris clean-up at DRAPER site. - Received burn permit from Rosebud County. - Haul water from stock dam for fire protection, dig burn pit and begin burning debris. - Begin excavation of Adit 1 and SP 3. - Eight feet was as far as could be excavated at one time into Adit 1. Farther excavation causes the tunnel roof to cave. - Excavating down to the base of Adit 1 and backfilling top of Adit 1 and SP 3. - Fire in burn pit watered down and covered with borrow material.

E. Daily Construction Log (Cont.)

July 10, 1987

- Backhoe breaks down. Contractor cannot get parts in Forsyth. Will close down until July 13.
- Received new burn permit.
- Backfilling Adit 1 and SP 3 area with coal slack using dozer.
- Continue debris clean-up and burning.
- Remove concrete foundation and use as backfill in Shaft 2.
- Build small ramp up to the mouth of Shaft 2 to accommodate backfilling with dozer.
- Burn pit watered down and covered with borrow.
- Extend length of burn pit with backhoe for July 14 burning.

July 14, 1987

- Continue debris clean-up.
- Haul remainder of concrete foundation to Shaft 2.
- Continue burning debris.
- Complete backfilling Adit 1, Shaft 2, and SP 3 with backhoe.
- Backfill Shaft 1 with coal slack using dozer.
- Spread remainder of coal slack around Shaft 1 to be limed and buried.
- Spreading lime on Coal Slack Pile 2.
- Topsoil removal from SP 1 and 2 with backhoe.
- Set warning sign post near SP 1 and 2.

July 15, 1987

- Borrow and compaction of SP 1 and 2.
- Continue spreading lime on Coal Slack Area 2 below Shaft 1 and on Coal Slack Pile 2.
- Check average weight of straw mulch bales. 60 lbs per bale.
- Spread borrow over Shaft 1, Coal Slack Pile 2 and Coal Slack Area 2.
- Lime complete on Coal Slack Area 1 and remaining coal in Slack Pile 1.
- Spread borrow on Coal Slack Area 1 and Coal Slack Pile 1 with dozer.
- All limed areas have been disk.
- Spreading topsoil on all areas of disturbance.
- Mulching and crimping all disturbed areas.
- Contractor mobilizing equipment to Glendive.

Oct. 26, 1987

- Mobilize revegetation equipment to DRAPER site. Begin fertilizing 1.0 acres (92.0 lbs. of pure nutrients) and seeding 1.0 acres (23 lbs. of pure live seed).
- Add mulch to all seeded areas (1159 lbs. mulch).
- Place 1440 sq. ft. of CURLEX erosion control blanket on the steep portion of Adit 1.

E. Daily Construction Log (Cont.)

Oct. 27, 1987
- Mobilize equipment to the CROW ROCK site.
- Seeded 1.68 acres with 38 lbs. of pure live seed.
- Fertilized 1.68 acres with 155.0 lbs. of pure nutrients.
- Added extra mulch to all areas (1994 lbs. mulch).

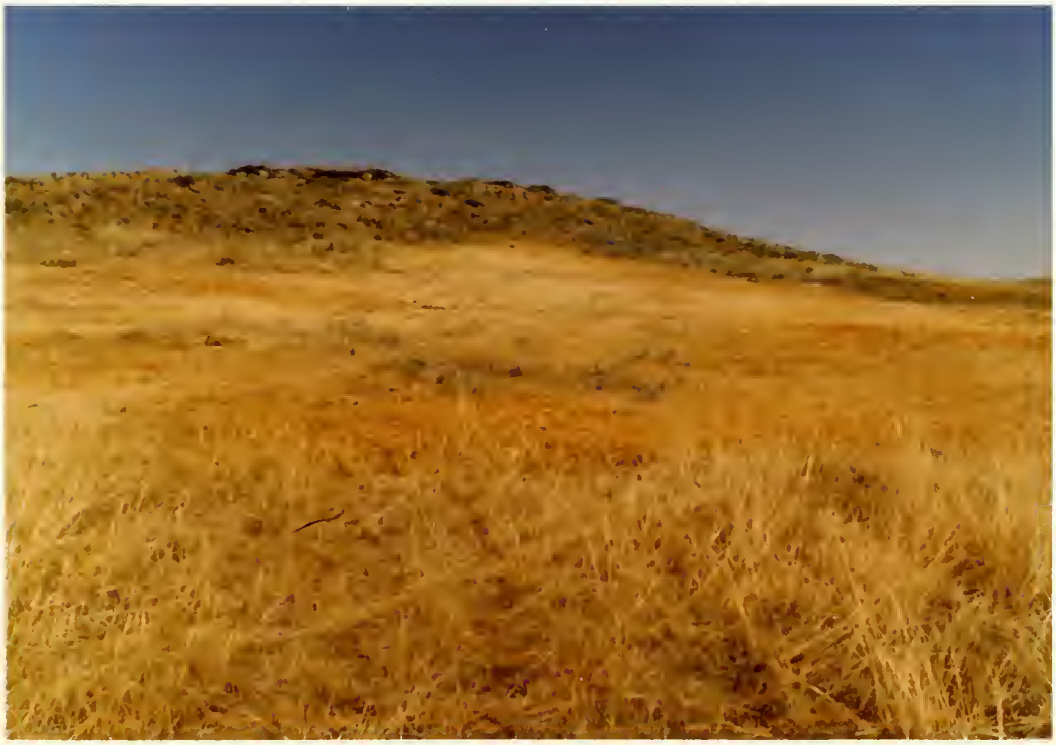
Oct. 28, 1987
- Seeding and fertilizing completed at the CROW ROCK and DRAPER sites.
- Mobilized equipment for Glendive.

III SLIDES

The description of the slides taken to document the work performed at each of the sites is found in Appendix A. In addition, the original slides are found at the very back of one volume and black and white copies of the slides are found in all three volumes directly behind the slide descriptions in Appendix A.

Two prints showing views of the reclamation work are found on the following page.

CROW ROCK: Placing wooden coal cars on flatbed for transport to museum in Miles City.



DRAPER: Shaft 1 and Coal Slack Pile and Area 2 after revegetation.

IV. COST SUMMARY

A. Final Payment Request And Reconciliation Change Orders

The following reconcilatory change orders were executed during the course of the project.

Change Order No. 1 - Issued July 15, 1987 with the First Payment Request for Item No. 5 - New subsidence backfill at the CROW ROCK site. Item No 10 - The area requiring liming was reduced by 0.11 acres at the DRAPER site. Item No 13 - The area requiring mulching was increased to account for a larger borrow area at CROW ROCK. Item No 14 - The fence alignment was changed to include a larger borrow area at CROW ROCK.

Change Order No. 2 - Issued November 9, 1987 with the Final Payment Request. Final contract adjustment for actual quantities used of seed, fertilizer and mulch (Bid Items 11, 12, and 13) and the addition of fabricated mulch at DRAPER.

A copy of the Final Payment Request and Change Orders 1 and 2 are contained in Appendix B of this report. These documents summarize the final quantities and costs for each item.

B. Cost Per Site

1. Project Cost Summary

Site	Disturbed Acres	Cost/Acre	Total Project Cost
CROW ROCK	1.68	6,270.66	10,534.71
DRAPER	1.00	10,191.42	10,191.42
TOTAL	2.68	$ 7,733.63	$ 20,726.13

2. Project Cost Breakdown

Item	Quantity	Cost per Unit	Cost per Acre	Total Cost
CROW ROCK (1.68 acres)				
Mobilization	1 L.S.	750.00	446.43	750.00
Removal of Structures	1 L.S.	400.00	238.10	400.00
Debris Cleanup	1 L.S.	400.00	238.10	400.00
Salvage & Replace Topsoil	230 CuYd	4.57	625.00	1,050.00
Subsidence Backfill	956 CuYd	2.12	1,207.14	2,028.00
Adit Backfill (3 Adits)	363 CuYd	4.13	892.86	1,500.00
Pure Live Seed	38.64 Lbs	22.00	506.00	850.08
Fertilizer	154.63 Lbs	1.00	92.04	154.63
Vegetative Mulch	4970 Lbs	0.40	1,183.33	1,988.00
Farm Fence Type F-4M	581 L.Ft.	1.00	345.83	581.00
Single Panel	1 Each	75.00	44.64	75.00
Double Panel	4 Each	100.00	238.10	400.00
Gate - Type G-2	16 L.Ft.	8.00	76.19	128.00
SUBTOTAL			6,133.76	10,304.71
Change Order 1				
Subsidence Backfill				
Backhoe	2 Hours	45.00	53.57	90.00
Scraper	2 Hours	70.00	83.33	140.00
CROW ROCK TOTAL			6,270.66	$10,534.71
DRAPER (1.00 acres)				
Mobilization	1 L.S.	750.00	750.00	750.00
Removal of Structure	1 L.S.	250.00	250.00	250.00
Debris Cleanup	1 L.S.	400.00	400.00	400.00
Salvage & Replace Topsoil	63 CuYd	7.14	450.00	450.00
Subsidence Backfill	177 CuYd	7.57	1,340.00	1,340.00
Shaft Backfill (2 Shafts)	151 CuYd	5.30	800.00	800.00
Excavation of Mine Workings	1 L.S.	2,000.00	2,000.00	2,000.00
Waste Pile Disposal	1 L.S.	1,000.00	1,000.00	1,000.00
Lime Placement	0.34 Acres	3,000.00	1,020.00	1,020.00
Pure Live Seed	22.99 Lbs	22.00	505.78	505.78
Fertilizer	92.04 Lbs	1.00	92.04	92.04
Vegetative Mulch	2959 Lbs	0.40	1,183.60	1,183.60
SUBTOTAL			9,791.42	9,791.42
Change Order 2				
Fabricated Mulch	160 SqYd	2.50	400.00	400.00
DRAPER TOTAL			10,191.42	$10,191.42

3. Cost Per Yard

A total of 293 cubic yards of topsoil were moved at a lump sum price of $1,500 or $5.12 per yard. A total of 1133 cubic yards of fill were placed in subsidence areas at a lump sum price of $3,368 or $2.97 per yard. A total of 514 cubic yards of fill were placed in 3 adits and 2 shafts for a lump sum price of $2,300 or $4.47 per yard.

V. SUMMARY

A. Completed Reclamation

The Contractor used 27 calendar days or 45% of the 60 day contract time and actually completed the work in 15 working days.

CROW ROCK

The CROW ROCK project was completed by backfilling and compaction of three open adits in the banks of Uall Creek using waste (borrow) that was left over from an early strip mine operation. The seven subsidence features were backfilled and compacted with material from the same borrow area. One new subsidence feature opened up due to the weight of the water truck and was backfilled in the same manner under Change Order 1, Bid item 5. All debris was disposed of and all disturbed areas were topsoiled and revegetated thereby restoring the area to its pre-mining condition.

DRAPER

The DRAPER project was completed by removal and burial of three coal slack areas and liming the remaining coal slack. One large shaft was filled with coal slack and borrow. An air shaft was filled in the same manner including concrete demolished from a foundation also located on the site. A single adit with a subsidence feature directly above it was excavated and filled with coal slack. The adit excavation was covered with borrow and an erosion control blanket was placed on the disturbed area after seeding and fertilizing. Two remaining subsidence features were backfilled and compacted. The debris littering the site was removed by burning and burying on site. All disturbed areas were seeded, fertilized and mulched restoring the area to its pre-mining condition.

B. Comments

The pre-bid comments by several contractors indicated they liked the use of photographs on the Site Plans and the layout of the location maps made the sites easy to locate. Based on discussions with the contractors, most do not read the bid packages. They look at and fill in the Bid Sheet based on the pre-bid meeting and by looking at the Site Plan sheets. It is therefore advisable to put all the information you wish the contractor to see on the Site Plans.

All construction work at these two sites was complete by the Contractor as specified. The plans and specifications were easily understood by the Contractor in all phases of the work.

The majority of the line items under the cost per acre numbers presented in the Cost Summary become somewhat meaningless because each site is so different with differing amounts of debris, etc. Even the cost per yard numbers can vary significantly because of differing site conditions (DRAPER's subsidence backfill included filling in the excavated Adit 1 and SP 3 which was difficult, time consuming and costly compared to the sink holes filled in at CROW ROCK).

C. Recommendations

CROW ROCK: Future subsidence potential is possible as witnessed by the new subsidence area which opened up due to the weight of a water truck loaded with 2500 gallons. This area should be monitored for future subsidence and the revegetation should be monitored to assure that it gets off to a good start the next couple years.

The revegetated area is exposed to heavy winds. The use of netting across the entire mulching job on windy area should be considered in the future.

DRAPER: The warning sign was removed within one week of installation. The usefulness of signs on some of these sites is limited. DSL is now revising the Technical Specifications on installation of signs which should make them slightly more permanent.

Future subsidence is not a high probability due to the depth of the coal.

The erosion control blanket installed above Adit 1 will reduce water erosion across its easily eroded slopes. The remaining revegetation should be monitored to assure that it takes hold since erosion of the newly vegetated areas is the most likely problem to occur at DRAPER.

APPENDIX A

SLIDE DESCRIPTIONS
BY PROJECT

CROW ROCK SITE
SLIDE DESCRIPTIONS

ASSIGNED NUMBER	DATE TAKEN	SLIDE NUMBER	SUBJECT OR COMMENTS
1	6-29-87	2-A	Allis Chalmers HD-11 dozer.
2	6-29-87	3-A	Dodge dump truck with 4.5 cy capacity.
3	6-29-87	4-A	Case 680E combination backhoe and front end loader.
4	6-29-87	5-A	International water truck with 2500 gallon capacity.
5	6-29-87	6-A	Spray bar for International water truck.
6	6-29-87	7-A	Spoil pile and borrow area prior to reclamation.
7	6-29-87	8-A	Subsidence Pit 1 prior to reclamation.
8	6-29-87	9-A	Tipple area prior to reclamation.
9	6-29-87	10-A	Adit 1 prior to reclamation.
10	6-29-87	11-A	Pickup body prior to disposal.
11	6-29-87	12-A	Adit 2 and car body prior to reclamation.
12	6-29-87	13-A	Haul road prior to reclamation.
13	6-29-87	14-A	Adit 3 prior to reclamation.
14	6-29-87	15-A	Storage shed prior to disposal.
15	6-29-87	16-A	SP 5, SP 6, and SP 7 prior to reclamation.
16	6-29-87	17-A	Pre-construction view of SP 4.
17	6-29-87	18-A	Pre-construction view of SP 2A.
18	6-29-87	19-A	Pre-construction view of SP 3.
19	6-29-87	20-A	Boyd Aero mulcher with a 4 cyl. Wisconsin engine and C-65 Chevy flat bed truck.
20	6-29-87	21-A	110-11B Michigan Clark paddle scraper, 11 cy capacity.
21	6-29-87	22-A	Topsoil removal from borrow area using 110-11B scraper.

CROW ROCK SITE
SLIDE DESCRIPTIONS

ASSIGNED NUMBER	DATE TAKEN	SLIDE NUMBER	SUBJECT OR COMMENTS
22	6-29-87	23-A	Topsoil removal from SP 5, 6, and 7 using 680E backhoe.
23	6-29-87	24-A	Topsoil removal from SP 7 using 680E backhoe and HD-11 dozer.
24	6-29-87	25-A	Topsoil removal from SP 4 using 680E backhoe.
25	6-29-87	26-A	Topsoil removal from SP 3 using 680E backhoe.
26	6-29-87	27-A	Debris removal below Adit 3 using dump truck.
27	6-29-87	28-A	Removing car body from Adit 2 area with 680E backhoe.
28	6-29-87	29-A	Placing car body in SP 7 with 680E backhoe.
29	6-29-87	30-A	Crushing car body with 680E backhoe.
30	6-30-87	31-A	Using SP 7 as a burn pit.
31	6-30-87	32-A	View of SP 7 and water truck stuck in new subsidence pit (SP 8).
32	6-30-87	33-A	New Subsidence Pit 8 above SP 7.
33	6-30-87	34-A	Topsoil removal SP 2A using 680E backhoe and HD-11 dozer to hold backhoe on slope.
34	6-30-87	35-A	Transporting borrow material to SP 3 using 110-11B scraper.
35	6-30-87	36-A	Filling and compacting SP 3 using backhoe.
36	7-01-87	4	Removing ore car and buried track at tipple using 680E backhoe and dump truck.
37	7-01-87	5	Topsoil removal from Adit 3 using backhoe.
38	7-01-87	6	Placing warning sign near SP 7 and borrow material placed in SP 7.
39	7-02-87	7	Topsoil removal from SP 8 using 680E backhoe.
40	7-02-87	8	New subsidence feature (SP 8) water truck created by its weight near SP 5, 6 and 7.

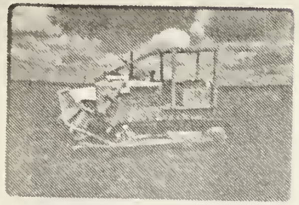
CROW ROCK SITE
SLIDE DESCRIPTIONS

ASSIGNED NUMBER	DATE TAKEN	SLIDE NUMBER	SUBJECT OR COMMENTS
41	7-02-87	9	Excavation of new subsidence feature (SP 8) using 680E backhoe.
42	7-02-87	10	Warning sign near SP 5, 6, and 7.
43	7-02-87	11	Backfill & compaction of Adit 3 using 680E backhoe and HD-11 dozer.
44	7-02-87	12	Dozer stuck in gear on slope below Adit 3.
45	7-02-87	13	Dozer returning up hill after repairs.
46	7-02-87	14	Excavate Adit 2 using 680E backhoe.
47	7-02-87	15	Excavate Adit 1 using 680E backhoe.
48	7-02-87	16	Coal car removed by L.P. Anderson out of Mile City, MT. for the museum.
49	7-02-87	17	Compaction of SP 2A using HD-11 dozer.
50	7-02-87	18	Compaction of Adit 2 using HD-11 dozer.
51	7-02-87	19	Backfill Adit 1 using 680E backhoe.
52	7-03-87	20	Watering borrow area before hauling with scraper.
53	7-03-87	21	Construction of fence corner panel.
54	7-06-87	22	Backfilling SP 1 using 680E backhoe.
55	7-06-87	23	SP 1 prior to reclamation.
56	7-06-87	24	HD-11 dozer reclaiming SP 1.
57	7-07-87	25	Mulching SP 1 with Boyd Aero mulcher.
58	7-07-87	26	Mulching Adit 1 with Boyd Aero mulcher.
59	7-07-87	27	Mulching Adit 1 with Boyd Aero mulcher.
60	7-07-87	28	Mulching Adit 2 with Boyd Aero mulcher.
61	7-07-87	29	Mulching Adit 3 with Boyd Aero mulcher.
62	7-07-87	30	Mulching SP 3 with Boyd Aero mulcher.

CROW ROCK SITE
SLIDE DESCRIPTIONS

ASSIGNED NUMBER	DATE TAKEN	SLIDE NUMBER	SUBJECT OR COMMENTS
63	7-07-87	31	Mulching SP 2A with Boyd Aero mulcher.
64	7-07-87	32	Mulching SP 2A with Boyd Aero mulcher.
65	7-07-87	34	Adit 1 after mulching and tracking with HD-11 dozer.
66	7-07-87	35	Adit 2, SP 2A, and SP 3 following reclamation.
67	7-07-87	36	Tracking mulch in SP 1 area with HD-11 dozer.
68	7-07-87	37	Borrow area following reclamation.
69	7-07-87	38	Post-reclamation fencing prior to placement of stays in gate.

CROW ROCK
HD-11 ALLISCHALMERS CAT

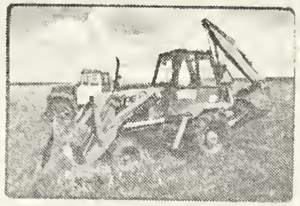


①
6-29-87
SPECTRUM 2-A

CROW ROCK - SPECTRUM
DODGE DUMP TRUCK

6-29-87
3-A

CROW ROCK - SPECTRUM
680E BACK HOE

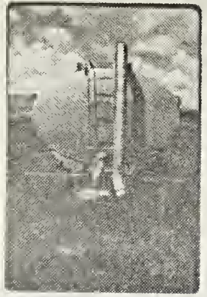


3
6-29-87 MITCHELL BROS.
4-A

CROW ROCK - SPECTRUM
INT. DIESEL WATER TRK.
2500 GAL.

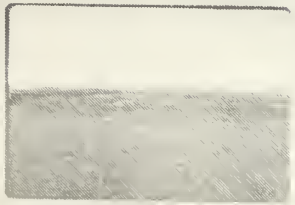
4
6-29-87 MITCHELL BROS CONST
5-A

CROW ROCK - SPECTRUM
INT. WATER TRK.



5
6-A
6-29-87
SPRAY BAR
MITCHELL BROS. CONST

CROW ROCK - SPECTRUM
PRE CONST.
BORROW AREA



6-29-87
7-A

CROW ROCK - SPECTRUM
PRE-CONST. SP-1

7
6-29-87
8-A

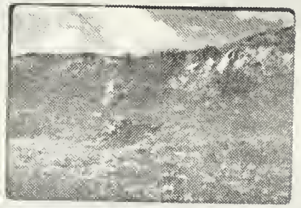
CROW ROCK - SPECTRUM
PRE-CONST - TIPPLE

8
6-29-87
9-A

CROW ROCK - SPECTRUM
PRE-CONST. ADIT #1

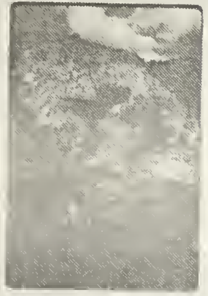
⑨
6-29-87
10-A

CROW ROCK - SPECTRUM
PRE-CONT. Pickup Body



⑩
6-29-87
11-A

CROW ROCK - SPECTRUM
PRE-CONST ADIT #2 & CAR Body



11
6-29-87

CROW ROCK - SPECTRUM
PRE-CONST - HAUL Rd.

6-29-87

CROW ROCK - SPECTRUM
PRE-CONST - ADIT #3

13
6-29-87

CROW ROCK - SPECTRUM
PRE-CONST. STORAGE SHED

⑭
6-29-87
15-A

CROW ROCK - SPECTRUM
PRE-CONST. SP-5, 6 & 7

15
6-29-87
16-A

CROW ROCK - SPECTRUM
PRE-CONST. SP-1

6-29-87

CROW ROCK - SPECTRUM
PRE-CONST. SP-2A

6-29-87

CROW ROCK - SPECTRUM
PRE-CONST - SP-3

18 6-29-87

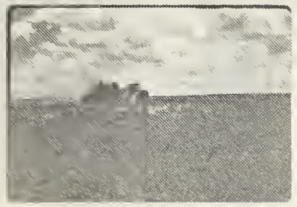
CROW ROCK
CONST. EQUIP Boyd AERO MULCHER

19 C-65 CHEVY FLAT BED
& Crimping MACHINE
6-29-87

CROW ROCK - SPECTRUM
CONST. EQUIP. 110-11B
MICHIGAN, CLARK, PADDLE SCRAPER

20 11 CU. yds
6-29-87

CROW ROCK - SPECTRUM
TOP SOIL REMOVAL
w/ 11B SCRAPER



21 6-29-87

CROW ROCK - SPECTRUM
TOPSOIL REMOVAL
SP- 5, 6 & 7 680E BACKHOE

22 6-29-87

CROW ROCK - SPECTRUM
TOP SOIL REMOVAL
SP-7

23 6-29-87

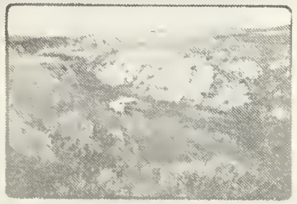
CROW ROCK - SPECTRUM
TOPSOIL - SP-4
680E BACKHOE

24 6-29-87

CROW ROCK - SPECTRUM
TOPSOIL S-P-3

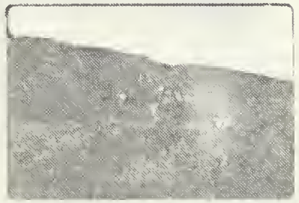
25 6-29-87

CROW ROCK - SPECTRUM
DEBRIS CLEANUP
IN DRAIN BELOW ADIT #3



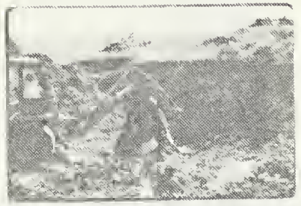
26 6-29-87

CROW ROCK - SPECTRUM
REMOVING CAR Body
BELOW ADIT #2



27 6-29-87

CROW ROCK - SPECTRUM
PLACING CAR Body
IN SP-7

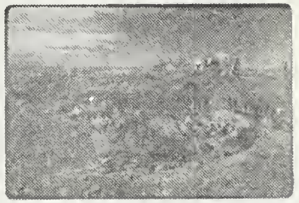


28 6-29-87

CROW ROCK - SPECTRUM
CRUSHING CAR Body

29 6-29-87

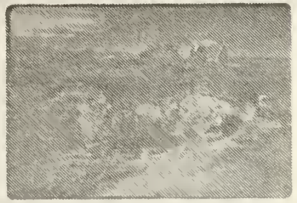
CROW ROCK - SPECTRUM
USING SP-7 FOR BURN PIT



30 6-30-87

CROW ROCK - SPECTRUM

BURN PIT & WATER TNK
FALLS THRU NEW SINK HOLE



(31) 6-30-87

CROW ROCK - SPECTRUM
NEW SP ABOVE SP-7

(32) 6-30-87

CROW ROCK - SPECTRUM
TOPSOIL REMOVAL SP-2A
USING HD-11 CAT TO HOLD
BACKHOE ON HILL

(33) 6-30-87

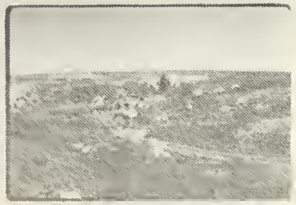
CROWROCK - SPECTRUM
11cuyd. SCRAPER Dumping
@ SP-3

(34) 6-30-87

CROW-ROCK - SPECTRUM
680E BACK HOE - FILLING
& COMPACTING SP-3

(35) 6-30-87

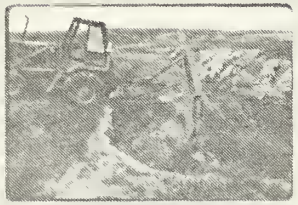
CROWROCK - SPECTRUM
REMOVING RAILS & ORE
CAR BEHIND TIPPLE



(36) 7-1-87

CROWROCK

TOP SOIL REMOVAL
ADIT #3

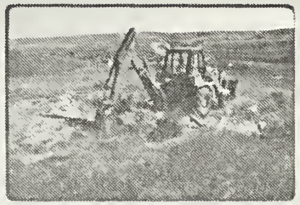


(37) 7-1-87

CROW ROCK - SPECTRUM
SP-7 - RECLAMATION SIGN
BEING INSTALLED

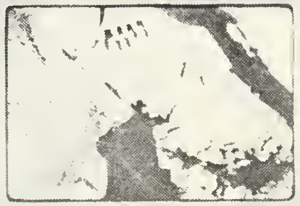
(38) 7-1-87

CROWROCK - SPECTRUM
SP-8 TOP SOIL REMOVAL



(39) 7-2-87

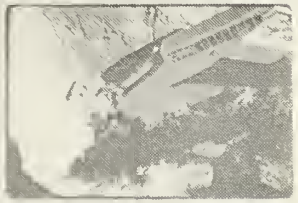
CROWROCK - SPECTRUM
NEW SINK HOLE SP-8
ABOVE SP-5,6 & 7



(40) 7-2-87

CROW-ROCK - SPECTRUM

Digging OUT NEW SINK HOLE
SP-8



(41) 7-2-87

CROW ROCK - SPECTRUM
RECLAMATION SIGN ABOVE
SP-[illegible]

(42) 7-2-87

CROWROCK - SPECTRUM
FILLING & COMPACTION ADIT #3
580E BACKHOE

(43) 7-2-87

CROWROCK - SPECTRUM
HD-11 CAT STUCK in forward
GEAR Rolling Down Hill Below
ADIT 5

(44) 7-2-87

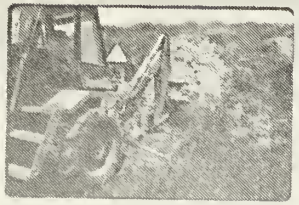
CROWROCK - SPECTRUM
HD-11 CAT Coming Up Hill
AFTER REPAIRS

(45) 7-2-87

CROW ROCK - SPECTRUM
Digging out ADIT # 2
680E BACK HOE

(46) 7-2-87

CROW ROCK - SPECTRUM
Digging out ADIT # 1
680E BACKHOE



(47) 7-2-87

CROW ROCK - SPECTRUM
LOADING ORE CAR FOR
TRANSPORT TO MILE'S CITY

(48) 7-2-87

CROW ROCK - SPECTRUM
COMPACTION SP-2A

(49) 7-2-87

CROW ROCK - SPECTRUM
FILLING & COMPACTING
ADIT#1

(50) 7-2-87

CROW ROCK - SPECTRUM
ADIT #1 filling &
compacting

(51) 7-3-87

CROW ROCK - SPECTRUM
WATERING BORROW BEFORE
HAULING

(52) 7-3-87

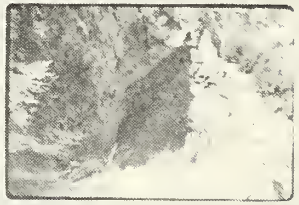
CROW ROCK - SPECTRUM
FENCE PANEL INSTALLATION

(53) 7-3-87

CROW ROCK - SPECTRUM
BACKFILL SP-1 - 680E
BACK HOE

(54) 7-6-87

CROW ROCK - SPECTRUM
SP-1
PRIOR TO BACKFILLING



(55) 7-6-87

CROW ROCK - SPECTRUM
HD-11 CAT WORKING SP-1

(56) 7-6-87

CROW ROCK - SPECTRUM
mulching SP-1
Bowie Aero mulcher

(57) 7-7-87

CROW ROCK - SPECTRUM
Mulching ADIT #1

(58) 7-7-87

CROW ROCK - SPECTRUM
Mulching ADIT #1

(59) 7-7-87

CROW ROCK - SPECTRUM
Mulching ADIT # 2

(60) 7-7-87

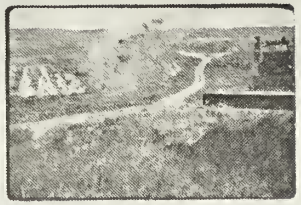
CROWROCK - SPECTRUM
Mulching ADIT #3

(61) 7-7-87

CROW ROCK - SPECTRUM
Mulching SP-3

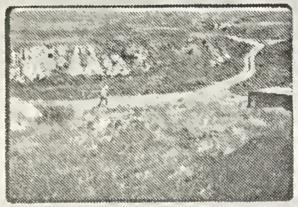
(62) 7-7-87

CROWROCK - SPECTRUM
MULCHING - SP-2A



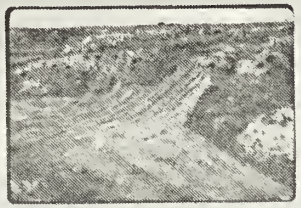
(63) 7-7-87

CROWROCK - SPECTRUM
MULCHING - SP-2A



(64) 7-7-87

CROWROCK - SPECTRUM
POST CONST. ADIT #1



(65) 7-7-87

CROWROCK - SPECTRUM
POST CONST. ADIT 2, SP-2A,
& SP-3

(66) 7-7-87

CROWROCK - SPECTRUM
POST CONST - SP-1

(67) 7-7-87

CROWROCK - SPECTRUM
POST CONST. BORROW AREA

(68) 7-7-87

CROWROCK - SPECTRUM
POST CONST. FENCING

(69) 7-7-87

DRAPER SITE
SLIDE DESCRIPTIONS

ASSIGNED NUMBER	DATE TAKEN	SLIDE NUMBER	SUBJECT OR COMMENTS
70	7-08-87	1	McCormick disk used for lime disking.
71	7-08-87	2	580E front end loader.
72	7-08-87	3	Fordson tractor which pulls crimper device.
73	7-08-87	4	Shaft 1, Coal Slack Pile 2, and related debris prior to reclamation.
74	7-08-87	5	Pre-construction view of Shaft 2.
75	7-08-87	6	View of SP 2 prior to reclamation.
76	7-08-87	7	SP 1 prior to reclamation.
77	7-08-87	8	Adit 1 prior to reclamation.
78	7-08-87	9	SP 3 above Adit 1 prior to reclamation.
79	7-08-87	10	Debris (old dugouts) northeast of Adit 1 prior to reclamation.
80	7-08-87	11	Coal Pile 2 and debris surrounding Shaft 1 prior to reclamation.
81	7-08-87	12	Cement foundation prior to reclamation.
82	7-08-87	13	Burn pit area below Shaft 1.
83	7-08-87	14	Excavation of Adit 1.
84	7-08-87	15	Excavation of Adit 1 eight feet into caved tunnel.
85	7-08-87	16	Excavation of Adit 1 into caved tunnel.
86	7-08-87	17	Excavation of Adit 1 into caved tunnel.
87	7-08-87	18	Excavation of Adit 1 & SP 3 working from SP 3 down to base of Adit 1.
88	7-08-87	19	Excavation of Adit 1.

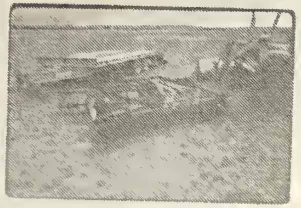
DRAPER SITE
SLIDE DESCRIPTIONS

ASSIGNED NUMBER	DATE TAKEN	SLIDE NUMBER	SUBJECT OR COMMENTS
89	7-08-87	20	Backfilling Adit 1 with coal slack from pile below Adit 1.
90	7-08-87	21	Shaft 2, topsoil removal and building dumping ramp.
91	7-08-87	22	Backfilling Shaft 2 with material from the demolished concrete foundation.
92	7-09-87	23	Backfilling Adit 1 and SP 3 and covering coal slack.
93	7-09-87	24	Coal pile prior to liming.
94	7-14-87	25	Backfilling Shaft 1 with coal slack.
95	7-14-87	26	Topsoil removal from SP 1 using 580E backhoe.
96	7-14-87	27	Liming Coal Slack Pile 1 with tractor and broadcaster.
97	7-14-87	28	Post-construction view of Shaft 2 prior to mulching.
98	7-14-87	29	Disking lime into Coal Slack Pile 1 with tractor.
99	7-15-87	30	Borrow material over limed Coal Slack Pile 1.
100	7-15-87	31	Crimping Coal Slack Pile 2 with tractor.
101	7-15-87	32	Coal Slack Pile 1 and Shaft 1 following reclamation.
102	7-16-87	13-A	Coal Slack Pile 1 and Shaft 1 after reclamation.
103	7-16-87	14-A	Foundation area following reclamation.
104	7-16-87	15-A	Borrow Area 2 following reclamation.
105	7-16-87	16-A	Warning sign and SP 1 and 2 after reclamation.
106	7-16-87	17-A	Haul road near Borrow Area 1 after reclamation.
107	7-16-87	18-A	Post-construction view of Borrow Area 1.

DRAPER SITE
SLIDE DESCRIPTIONS

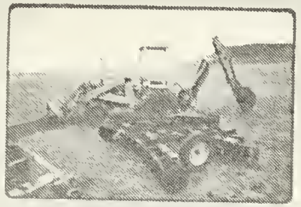
ASSIGNED NUMBER	DATE TAKEN	SLIDE NUMBER	SUBJECT OR COMMENTS
108	7-16-87	19-A	Post-construction of Borrow Area 1.
109	7-16-87	20-A	Adit 1 and coal slack area following reclamation.
110	7-16-87	21-A	Haul road between Adit 1 and Coal Slack Area 1 following reclamation.
111	7-16-87	22-A	Coal Slack Area 1 following reclamation.
112	7-16-87	23-A	Coal Slack Area 1 following reclamation.
113	10-27-87	1	Erosion control blanket over Adit 1 and SP 3.
114	10-27-87	2	Erosion control blanket over Adit 1 and SP 3.
115	10-27-87	3	Mulching Shaft area 1 during final revegetation.
116	10-27-87	4	McCormick seed drill during final revegetation.
117	10-27-87	5	Mulch on one ton truck and trailer for final revegetation.

DRAPER / SPECTRUM
EQUIP - DISK for
LIME WORK



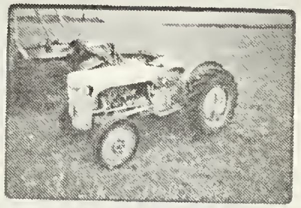
(70)
7-8-87
1

DRAPER / SPECTRUM
EQUIP - 580E BACKHOE
FRONT END LOADER



(71)
7-8-87
2

DRAPER / SPECTRUM
EQUIP - FORDSON TRACTER
Pulls CRIMPER

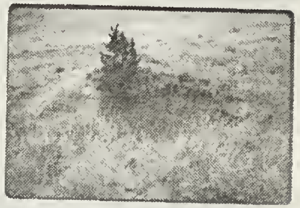


(72)
7-8-87
3

DRAPER / SPECTRUM
PRE-CONST SHAFT #1
COAL SLACK PILE #2

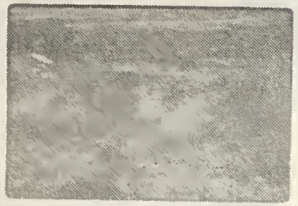
(73)
7-8-87
4

DRAPER / SPECTRUM
PRE-CONST.
SHAFT #2



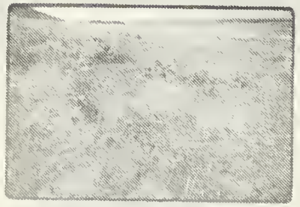
(74)
7-8-87
5

DRAPER / SPECTRUM
PRE-CONST.
SP-2



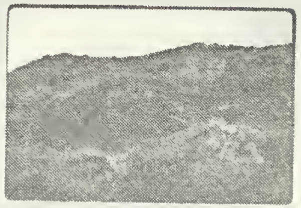
(75)
7-8-87
6

DRAPER / SPECTRUM
PRE-CONST.
SP-1



(76)
7-8-87
7

DRAPER / SPECTRUM
PRE-CONST
ADIT #1



(77)
7-8-87
8

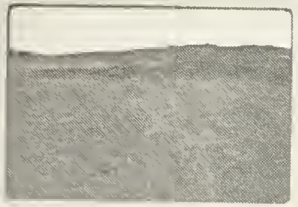
DRAPER / SPECTRUM
PRE-CONST.
SP-3

(78)
7-8-87
9

DRAPER / SPECTRUM
PRE-CONST.
DEBRIS

(79)
7-8-87
10

DRAPER / SPECTRUM
PRE-CONST.
DEBRIS - SHAFT #1 COAL PILE #2



(80)
7-8-87
11

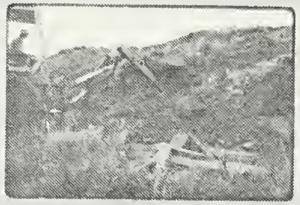
DRAPER / SPECTRUM
PRE-CONST.
CEMENT FOUNDATION

(81)
7-8-87
12

DRAPER / SPECTRUM
DIGGING BURN PIT
BELOW DEBRIS & SHAFT #1

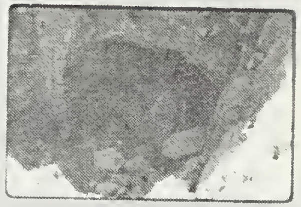
(82)
7-8-87
13

DRAPER / SPECTRUM
BEGIN EXCAVATION
ADIT #1



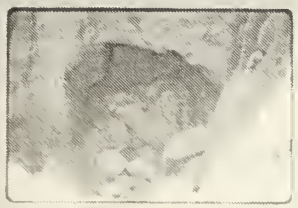
(83)
7-8-87
14

DRAPER / SPECTRUM
ADIT #1
EXCAVATION IN ADIT 8'



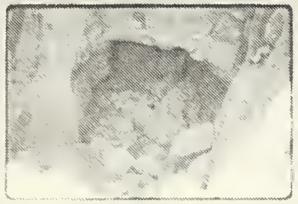
(84)
7-8-87
15

DRAPER / SPECTRUM
ADIT #1



(85) 7-8-87

DRAPER / SPECTRUM
ADIT #1



(86) 7-8-87

DRAPER SPECTRUM

7-8-87

(87)

PARTIAL EXCAVATION
ADIT #1 & SP-3

DRAPER / SPECTRUM
ADIT #1
EXCAVATION 3:18

(88) 7-8-87

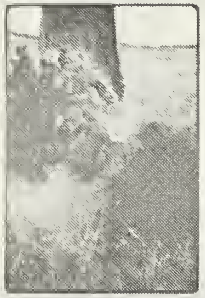
DRAPER / SPECTRUM
ADIT #1
PUSHING COAL SLACK INTO ADIT.

(89) 7-8-87

DRAPER / SPECTRUM
SHAFT #2
REMOVING TOP SOIL. Building Ramp

(90) 7-8-87

DRAPER / SPECTRUM
SHAFT #2

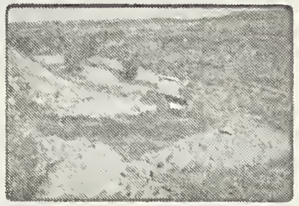


7-8-87

(91)

DUMP CONCRETE INTO SHAFT 2

DRAPER / SPECTRUM
ADIT 1, SP-3
BACKFILL



(92) 7-9-87

DRAPER / SPECTRUM
COAL SLACK PILE 2
PRIOR TO LIMING

(93) 7-9-87

DRAPER / SPECTRUM
SHAFT #1
BACK FILL W/ COAL SLACK

(94) 7-9-87

DRAPER / SPECTRUM
SP-1
TOP SOIL REMOVAL

(95) 7-14-87

DRAPER / SPECTRUM
COAL SLACK PILE #1
LIMING

(96) 7-14-87

DRAPER / SPECTRUM
SHAFT #2
PRIOR TO MULCHING

(97) 7-14-87

DRAPER / SPECTRUM
COAL SLACK PILE #1
DISKING IN LIME

(98) 7-14-87

DRAPER / SPECTRUM
COAL SLACK PILE #1
MOVING BORROW OVER SLACK

(99) 7-15-87

DRAPER / SPECTRUM
COAL SLACK PILE #2
CRIMPING

(100) 7-15-87 31

DRAPER / SPECTRUM
COAL SLACK PILE #1 - SHAFT #1
POST CONST

(101) 7-15-87 32

DRAPER / SPECTRUM
POST-CONST.
SHAFT #1 & COAL SLACK #1

(102) 7-16-87 13-A

DRAPER / SPECTRUM
POST-CONST
FOUNDATION AREA

(103) 7-16-87 14-A

DRAPER / SPECTRUM
POST-CONST.
BORROW AREA #2

(104) 7-16-87 15-A

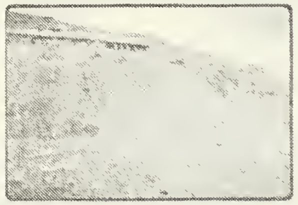
DRAPER / SPECTRUM
POST-CONST
SP-1&2 & [illegible]

(105) 7-16-87 16-A

DRAPER / SPECTRUM
HAUL R[illegible] BORROW #1

(106) 7-16-87 17-A

DRAPER / SPECTRUM
POST-CONST.
BORROW AREA #1



(107) 7-16-87 18-A

DRAPER / SPECTRUM
POST-CONST.
BORROW AREA #1

(108) 7-16-87 19-A

DRAPER / SPECTRUM
POST-CONST.
ADIT #1 - COAL PILE #1

(109) 7-16-87 20-A

DRAPER / SPECTRUM
POST-CONST.
HAUL Rd. BETWEEN ADIT #1 & COAL SLACK #1

(110) 7-16-87 21-A

DRAPER / SPECTRUM
POST-CONST.
COAL SLACK

(111) 7-16-87 22-A

DRAPER / SPECTRUM
POST CONST
COAL SLACK AREA 1

(112) 7-16-87 23-A

DRAPER - SPECTRUM
EROSION CONTROL BLANKET
ADIT 1

(113) 10-27-87 1-B

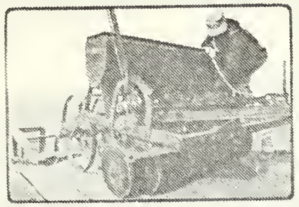
DRAPER -
EROSION CONTROL BLANKET
ADIT 1

(114) 10-27-87 2-B

DRAPER - SPECTRUM
mulch - SHAFT AREA I

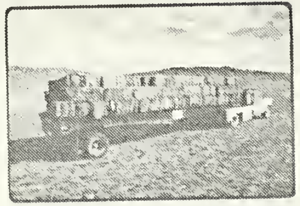
(115) 10-27-87 3-B

DRAPER - SPECTRUM
McCORMICK. SEED DRILL



(116) 10-27-87 4-B

DRAPER - SPECTRUM
MULCH ON A 1TON
FORD PICKUP & TRAILER



(117) 10-27-87 5-B

APPENDIX B

FINAL PAY REQUEST

AND

CHANGE ORDERS

Payment Request No. 2
Final

From: June 23, 1987 To: October 29, 1987
Project Name: Draper/Crow Rock
Location: Rosebud & Custer Counties, Montana
Project No.: Mont A/E 86-46-134
Name of Contractor: Mitchell Brothers, Inc.
Address: P.O. Box 736, Glendive
Montana 59330

Summary Of Project Status

Amount of Original Contract	$ 17,681.00
Amount of Approved Change Order(s)	3,045.13
TOTAL CONTRACT AMOUNT	20,726.13
Contract Time Used to Date	27 Days
Percentage of Contract Time Used	45 %
Percentage of Contract Amount Earned	100 %

Original Contract Amount Completed	17,681.00
Change Order(s) Amount Completed	3,045.13
Amount for Material On Site	0.00
TOTAL To Date	20,726.13
Times 90% =	No Retainage
TOTAL AMOUNT Earned to Date	20,726.13
Less Previous Amount Earned	15,716.16
Amount Payable This Period	5,009.97
Less 1% Gross Receipts Tax	50.10
TOTAL DUE CONTRACTOR THIS PERIOD	4,959.87

Requested By: Mitchell Brothers, Inc. Sec. (Contractor) Date: 11/16/87

Checked By: Spectrum Engineering William Maehl (Engineer) Date: 11/23/87

Approved By: Department of State Lands Abandoned Mine Reclamation Bureau (Owner) Date: 12/2/87

PAY REQUEST NO. 2 - FINAL
SPECTRUM ENGINEERING

PROJECT: DRAPER/CROW ROCK MONT. A/E 86-46-134

ITEMIZATION OF QUANTITIES AND COSTS

ITEM NO.	DESCRIPTION	ESTIMATED PLAN QUANTITY	UNIT BID PRICE	UNITS OF WORK COMPLETED THIS REQUEST	UNITS OF WORK COMPLETED TO DATE	TOTAL COST OF COMPLETED WORK	% OF EST. QUANT. COMP.
1	Mobilization	1 L.S.	1500.00	0	1	1500.00	100
2	Removal of Structures						
	DRAPER	1 L.S.	250.00	0	1	250.00	100
	CROW ROCK	1 L.S.	400.00	0	1	400.00	100
3	Debris Cleanup						
	DRAPER	1 L.S.	400.00	0	1	400.00	100
	CROW ROCK	1 L.S.	400.00	0	1	400.00	100
4	Salvage & Replace Topsoil	1 L.S.	1500.00	0	1	1500.00	100
5	Subsidence Backfill						
	DRAPER	1 L.S.	1340.00	0	1	1340.00	100
	CROW ROCK	1 L.S.	2028.00	0	1	2028.00	100
7	Close Mine Openings						
	DRAPER - Air Shafts	2	400.00	0	2	800.00	100
	CROW ROCK - Adits	3	500.00	0	3	1500.00	100
8	Excavation of Mine Workings						
	DRAPER	1 L.S.	2000.00	0	1	2000.00	100
9	Waste Pile Disposal - DRAPER	1 L.S.	1000.00	0	1	1000.00	100
10	Lime Placement	0.45 acres	3000.00	0	0.34	1020.00	100
11	Pure Live Seed	30 lb.	22.00	61.63	61.63	1355.86	100
12	Fertilizer	120 lb.	1.00	246.67	246.67	246.67	100
13	Vegetative Mulch	3,900 lb.	0.40	3153	7929	3171.60	100

PAY REQUEST NO. 2 - FINAL
SPECTRUM ENGINEERING

PROJECT: DRAPER/CROW ROCK MONT. A/E 86-46-134

ITEMIZATION OF QUANTITIES AND COSTS

ITEM NO.	DESCRIPTION	ESTIMATED PLAN QUANTITY	UNIT BID PRICE	UNITS OF WORK COMPLETED THIS REQUEST	UNITS OF WORK COMPLETED TO DATE	TOTAL COST OF COMPLETED WORK	% OF EST. QUANT. COMP.
14	Farm Fence Type F-4M	270 L.Ft.	1.00	0	581	581.00	100
	Single Panel	1 each	75.00	0	1	75.00	100
	Double Panel	4 each	100.00	0	4	400.00	100
	Gate - Type G-2	16 L.Ft.	8.00	0	16	128.00	100
	SUBTOTAL					20096.13	100
	CHANGE ORDER 1						
	Subsidence backfill - CROW ROCK						
	Backhoe	per hour	45.00	0	2	90.00	100
	Scraper	per hour	70.00	0	2	140.00	100
	CHANGE ORDER 2						
	Fabricated Mulch	SQ. YARD	2.50	160	160	400.00	100
ALL	TOTAL					20726.13	100

RECEIVED
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SECTION II

2.12 CHANGE ORDER

Order No. 1

Date: July 15, 1987

Agreement Date: June 23, 1987

NAME OF PROJECT: DRAPER/CROW ROCK

Rosebud & Custer Counties, MT Mont. A/E 86-46-134

OWNER: State of Montana, Department of State Lands

CONTRACTOR: Mitchell Brothers, Inc.

Change Orders must be accompanied by an itemized cost breakdown. You are hereby requested to comply with the following changes from the Contract Documents. (Show separate costs for materials, labor, equipment and miscellaneous. Show percent where applicable.)

ITEM NO.	DESCRIPTION OF CHANGES-ESTIMATED QUANTITIES & UNITS	COST OF CHANGES					TOTAL COST
		MAT'LS	LABOR	EQUIP	MISC	TOTAL UNIT COST	
	(SEE ATTACHED SHEET)						

TOTAL COST - MAT'LS, LABOR, EQUIPMENT & MISC. 561.40

OVERHEAD & PROFIT @______% (Incl. above)

GRAND TOTAL - THIS CHANGE ORDER 561.40

Original Contract Price	17,681.00
Current Contract Price Adjusted by Previous Change Order	17,681.00
Cost This Change Order (+ or -)	+ 561.40
New Contract Price Including This Change Order	18,242.40

SECTION II

2.12 CHANGE ORDER (CONT.)

The completion date as set forth in the Contract Documents shall be (unchanged, increased, decreased) by 0 calendar days.

The date for completion of all work will be August 22, 1987.

Description and Justification for Change:

1. Bid Item 5	- An additional sink hole opened up at Crow Rock. It was filled based on an on-site equipment rental basis (2.1 Proposal)
Bid Item 10	- The area requiring liming was reduced by 0.11 acres.
Bid Item 13	- The area requiring mulching was increased to account for a larger borrow area at Crow Rock.
Bid Item 14	- The fence alignment was changed to include a larger borrow area at Crow Rock.

SURETY CONSENT

The surety hereby consents to the aforementioned Contract Change Order and agrees that its bond or bonds shall apply and extend to the Contract as thereby modified or amended per this Change Order. The principal and the Surety further agree that on or after execution of this consent, the penalty of the applicable Performance Bond or Bonds is hereby increased by ______________________ ($______________) (One hundred percent (100%) of the Change Order amount) and the penalty of the applicable Payment Bond or Bonds is hereby increased by ______________________ ($______________) (One hundred percent (100%) of the Change Order amount).

COUNTERSIGNED BY MONTANA RESIDENT AGENT

____

____

SURETY

____

By: ______________________
(Seal)

Recommended by: Spectrum Engineering by William C. Maell, Engineer

Accepted by: Sec., Contractor

Approved by: Susan McNally, Owner

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2.12 CHANGE ORDER ATTACHMENT

Change Order No. 1
Draper/Crow Rock
Rosebud & Custer Counties, Montana
Montana A/E 86-46-134

QUANTITY VARIATIONS ON WORK ITEMS COMPLETED AS OF JULY 16, 1987

ITEM NO.	DESCRIPTION OF CHANGES-EST. QUANTITIES & UNITS	COST OF CHANGES			UNIT	CONTRACT UNIT COST	TOTAL COST
		QUANTITY					
		EST.	ACTUAL	DIFFERENCE			
5.	New subsidence backfill at Crow Rock Site						
	Case Backhoe 580	2	2	0	Hour	45	+ 90.00
	Clark 110-11-B Scraper	2	2	0	Hour	70	+ 140.00
10.	Lime Placement	0.45	0.34	-0.11	Acre	3000	- 330.00
13.	Vegetative Mulch	3900	4776	+876	Lbs.	0.40	+ 350.40
14	Farm Fence - FM4	270	581	+311	L.Ft.	1.00	+ 311.00
					TOTAL		+ 561.40

SECTION II

2.12 CHANGE ORDER

Order No. 2

Date: November 9, 1987

Agreement Date: June 23, 1987

NAME OF PROJECT: DRAPER/CROW ROCK

Rosebud & Custer Counties, MT Mont. A/E 86-46-134

OWNER: State of Montana, Department of State Lands

CONTRACTOR: Mitchell Brothers, Inc.

Change Orders must be accompanied by an itemized cost breakdown. You are hereby requested to comply with the following changes from the Contract Documents. (Show separate costs for materials, labor, equipment and miscellaneous. Show percent where applicable.)

ITEM NO.	DESCRIPTION OF CHANGES-ESTIMATED QUANTITIES & UNITS	COST OF CHANGES					TOTAL COST
		MAT'LS	LABOR	EQUIP	MISC	TOTAL UNIT COST	
	(SEE ATTACHED SHEET)						

TOTAL COST - MAT'LS, LABOR, EQUIPMENT & MISC.	2,483.73
OVERHEAD & PROFIT @ ____ %	(Incl. above)
GRAND TOTAL - THIS CHANGE ORDER	2,483.73

Original Contract Price	17,681.00
Current Contract Price Adjusted by Previous Change Order	18,242.40
Cost This Change Order (+ or -)	+ 2,483.73
New Contract Price Including This Change Order	20,726.13

2.12 CHANGE ORDER (CONT.)

The completion date as set forth in the Contract Documents shall be (unchanged, increased, decreased) by 0 calendar days.

The date for completion of all work will be October 29th, 1987.

Description and Justification for Change:

1. Bid Item 11, 12 & 13 - The area requiring seeding, fertilizing and mulching was increased to account for a larger borrow area and additional sink hole at Crow Rock and larger disturbance area at Draper.

   Bid Item N/A - From the time the bid package was prepared and work began, bad rains caused heavy erosion at Draper. The mulch requirements were changed to fabricated mulch (160 square yards) on one hillside.

SURETY CONSENT

The surety hereby consents to the aforementioned Contract Change Order and agrees that its bond or bonds shall apply and extend to the Contract as thereby modified or amended per this Change Order. The principal and the Surety further agree that on or after execution of this consent, the penalty of the applicable Performance Bond or Bonds is hereby increased by ______________________ ($______________) (One hundred percent (100%) of the Change Order amount) and the penalty of the applicable Payment Bond or Bonds is hereby increased by ______________________ ($______________) (One hundred percent (100%) of the Change Order amount).

COUNTERSIGNED BY MONTANA RESIDENT AGENT

____

____

SURETY

____

By: ______________________

(Seal)

Recommended by: Spectrum Engineering by William C Maehl, Engineer

Accepted by: Mitchell Bros, Inc. Sec., Contractor

Approved by: Richard, Owner

2.12 CHANGE ORDER ATTACHMENT

Change Order No. 2
Draper/Crow Rock
Rosebud & Custer Counties, Montana
Montana A/E 86-46-134

QUANTITY VARIATIONS ON WORK ITEMS COMPLETED AS OF NOVEMBER 9, 1987

ITEM NO.	DESCRIPTION OF CHANGES-EST. QUANTITIES & UNITS	COST OF CHANGES QUANTITY EST.	ACTUAL	DIFFERENCE	UNIT	CONTRACT UNIT COST	TOTAL COST
11.	Pure Live Seed	30	61.63	31.63	Lbs.	22.00	695.86
12.	Fertilizer	120	246.67	126.67	Lbs.	1.00	126.67
13.	Vegetative Mulch	4776	7929	3153	Lbs.	0.40	1261.20
	Fabricated Mulch	0	160	160	S.Y.	2.50*	400.00
						TOTAL	+2483.73

* Price agreed to from Daleview bid package for fabricated mulch.

APPENDIX C

ENGINEERING VERSUS
CONSTRUCTION COST ANALYSIS

CROW ROCK AND DRAPER
FINAL REPORT

ANALYSIS OF PROFESSIONAL SERVICE FEES
DATE OF PREPARATION: JANUARY 26, 1988

PROFESSIONAL SERVICE	AMOUNT
o Data Gathering, Site Evaluation, Preliminary Engineering, Final Engineering, Bidding Documents	$ 18,728.91
o Construction Administration, Construction Inspection, Final Report Preparation	$ 12,255.39
SPECTRUM ENGINEERING COSTS	$ 30,984.30
CONSTRUCTION COSTS	$ 20,726.13

PERCENTAGE ANALYSIS	PERCENT
PRE-CONSTRUCTION SPECTRUM ENGINEERING COST COMPARED TO CONSTRUCTION COST	90.4 %
CONSTRUCTION & POST-CONSTRUCTION SPECTRUM ENGINEERING COST COMPARED TO CONSTRUCTION COST	59.1 %
TOTAL SPECTRUM ENGINEERING PROJECT COST COMPARED TO CONSTRUCTION COST	149.5 %

REMARKS: Services provided included lien determination, landowner contact and consent, budget preparation, grant application, weed board approval, basic engineering, construction staking, contract administration, quantity accounting and full time construction/reclamation inspection. The project involved two sites with diverse reclamation requirements.